# DUBBS ARITHMETICAL PROBLEMS.

# DUBBS' ARITHMETICAL PROBLEMS

TO SUPPLEMENT
RAY'S NEW PRACTICAL ARITHMETIC

New York ·:· Cincinnati ·:· Chicago
AMERICAN BOOK COMPANY.

COPYRIGHT, 1893,
BY E. L. DUBBS & CO.

E-P

# PREFACE.

A THOROUGH knowledge of Arithmetic can not be acquired unless the student has had sufficient drill in its manifold departments to fix their principles firmly in his memory. Rapidity of execution and correctness of result can only be attained by continued practice and close attention to fundamental principles; and even then his efforts can not be completely successful unless he makes himself master of every subject. To accomplish this, he should have such a number of problems under each of the general departments as will almost exhaust them; and when we consider the immense number of combinations that can be proposed in the applications of common and decimal fractions and of percentage, it is evident that a corresponding number of problems should be given to illustrate them properly.

The text-books on Arithmetic now in use in our schools are standard works; but all teachers agree that in one essential respect they are defective—they do not embrace a sufficient number of examples to insure that proficiency which is the principal aim of every instructor. It follows, then, that there must be a demand for a carefully graded collection of problems that will supply this deficiency, and aid the teacher in his important work.

Three years ago it was suggested to the author that he write a book of test examples to supplement the corresponding departments of Ray's New Practical Arithmetic. After having consulted some of the leading edu-

cators in Hamilton County, he decided to undertake the work, and the result is a volume of 4500 problems, thoroughly classified, and so arranged as to supplement Ray's New Arithmetic, although it is intended to accompany any other text-book upon the same subject. The manuscript has been submitted to most of the leading educators of this county, and has received their unqualified approval, as the accompanying testimonials will certify.

Some of the advantages claimed for the work are briefly these: 1. A sufficient number of examples has been given in each department as almost to exhaust it. 2. The problems are presented in a very attractive manner, and most of them under entirely new conditions. 3. In reduction of compound numbers, more than half of the examples given under the tables are concrete. 4. In the applications of common and decimal fractions and interest—in fact, throughout the entire work—the answers are, with but few exceptions, exact. 5. Several new features have been introduced, as G. C. D. and L. C. M. of fractions, rules for forming triangles and trapezia, etc. 6. A chapter has been devoted to certain kinds of difficult problems, with suggestions and formulæ for their solution. Finally, the typography and binding are especially attractive, and can not fail to please any teacher who desires a handsomely printed and durable book of arithmetical problems.

EUGENE L. DUBBS.

*Cincinnati, August* 26, 1892.

# CONTENTS.


| | PAGE. |
|---|---|
| Addition, | 1 |
| Subtraction, | 7 |
| Addition and Subtraction, | 10 |
| Multiplication, | 12 |
| Short Division, | 15 |
| Long Division, | 17 |
| Promiscuous Examples, | 21 |
| United States Money, | 26 |
| Reduction, | 40 |
| Compound Numbers, | 64 |
| Longitude and Time, | 74 |
| Factoring, | 75 |
| Fractions, | 82 |
| Decimal Fractions, | 112 |
| Percentage, | 134 |
| Interest, | 179 |
| Discount, | 198 |
| Insurance, | 213 |
| Taxes, | 216 |
| Ratio, | 219 |
| Proportion, | 222 |
| Involution, | 244 |
| Evolution, | 245 |
| Mensuration, | 253 |
| Progressions, | 266 |
| Miscellaneous Problems, | 269 |
| Answers, | 273 |

# Dubbs' Arithmetical Problems

## ADDITION.

ARTICLE 19.

| 1. | 2. | 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|---|---|
| 345 | 360 | 401 | 524 | 632 | 716 | 4621 |
| 263 | 426 | 599 | 631 | 568 | 634 | 5376 |
| 421 | 532 | 632 | 758 | 794 | 895 | 6859 |
| 132 | 458 | 365 | 843 | 457 | 309 | 8472 |
| 514 | 241 | 426 | 927 | 813 | 540 | 7534 |
| 251 | 319 | 748 | 486 | 925 | 481 | 3293 |

| 8. | 9. | 10. | 11. | 12. | 13. | 14. |
|---|---|---|---|---|---|---|
| 2754 | 9876 | 1234 | 2345 | 5625 | 18625 | 68457 |
| 3865 | 5432 | 5678 | 6789 | 7854 | 43560 | 2943 |
| 4976 | 1098 | 9012 | 1234 | 3146 | 91125 | 75296 |
| 5087 | 7654 | 3456 | 5678 | 5236 | 86400 | 3750 |
| 6198 | 3210 | 7890 | 9012 | 7071 | 79775 | 84675 |
| 7209 | 6789 | 9898 | 3456 | 8888 | 80515 | 6789 |

| 15. | 16. | 17. | 18. | 19. | 20. |
|---|---|---|---|---|---|
| 96785 | 44444 | 10203 | 67890 | 987654 | 736491 |
| 43210 | 55555 | 20304 | 8765 | 321098 | 258057 |
| 85657 | 66666 | 30405 | 23456 | 765432 | 845316 |
| 34102 | 77777 | 40506 | 9473 | 109876 | 927209 |
| 78569 | 88888 | 50607 | 78901 | 543210 | 693584 |
| 21043 | 99999 | 60708 | 7654 | 987654 | 418625 |
| | | | | | 573948 |

| 21. | 22. | 23. | 24. | 25. |
|---|---|---|---|---|
| 321456 | 634219 | 926438 | 876 | 998877 |
| 750982 | 480356 | 618752 | 5432 | 665544 |
| 943871 | 177654 | 384949 | 10987 | 332211 |
| 194267 | 382299 | 706607 | 654321 | 223344 |
| 580629 | 847464 | 593186 | 23456 | 556677 |
| 862753 | 950183 | 876543 | 7890 | 889900 |
| 618547 | 766656 | 445566 | 987 | 112233 |

| 26. | 27. | 28. | 29. | 30. |
|---|---|---|---|---|
| 876678 | 39415 | 3861947 | 6475869 | 5465743 |
| 654456 | 962 | 7432586 | 8697081 | 8998899 |
| 432234 | 7374 | 5674924 | 7586453 | 1314156 |
| 210012 | 925819 | 9253856 | 2948675 | 3242777 |
| 765567 | 64053 | 6987439 | 5465768 | 6566678 |
| 543345 | 9746 | 5748295 | 4321043 | 9293945 |
| 987789 | 852837 | 2529768 | 9293949 | 2728290 |
| | | 4136372 | 2345678 | 4647489 |
| | | 8765439 | 9999999 | 7584932 |

| 31. | 32. | 33. | 34. |
|---|---|---|---|
| 1020304 | 9268325 | 729 | 9876543 |
| 5060708 | 4786 | 8380 | 987654 |
| 9010203 | 6329459 | 94547 | 98765 |
| 4050607 | 648 | 312864 | 9876 |
| 8090102 | 5763284 | 6275378 | 987 |
| 3040506 | 75859 | 826594 | 9876 |
| 7080901 | 483962 | 57910 | 98765 |
| 2030405 | 73 | 9876 | 987654 |
| 6070809 | 8906247 | 543 | 9876543 |

35. $4732+6859+1074+8562+7936+5625+3459+9873+5678=$what?

36. $2468+1357+9135+4680+6802+7913+8024+5791+3579=$what?

37. $83568+76294+51259+64387+53968+43210+35767+27583=$what?

38. $63745+84927+10186+73037+96852+56125+43210+33333=$what?

39. $572964+364656+929394+858687+666768+939495+424344=$what?

40. $653+7924+89147+123456+5432109+765481+94376+5285+712=$?

41. $49+349+2349+12349+94+894+7894+67894+567894+4567894=$?

42. $1234567+2345678+3456789+4567890+5678901+6789012+7890123=$?

43. A man, dying, left his property to his five children, giving to the oldest $2500, to the next $2250, to the third $2000, to the fourth $1750, and to the youngest $1500. What was the value of his property?

44. A wholesale clothing house imported six bales of cloth containing respectively, 397, 418, 376, 405, 389, and 427 yards. How many yards were in the lot?

45. Four vessels were loaded with the following quantities of wheat: 31625 bu., 29873 bu., 30748 bu., and 32009. What was the total quantity?

46. Five houses contained the following numbers of bricks: 39417, 43652, 38799, 41034, and 37098. How many bricks were there in all?

47. An oil refinery made six shipments of 15291 gal., 20768 gal., 18413 gal., 16945 gal., 19574 gal., and 17062 gal. How many gallons were shipped?

48. A steamer made seven trips from Pomeroy to Cincinnati, carrying the following cargoes of salt: 2987

bls., 3216 bls., 3193 bls., 2865 bls., 3349 bls., 3091 bls., and 2999 bls. How many barrels did she carry altogether?

49. Six companies of speculators bought public lands. The first, 9847 acres; the second, 10563 acres; the third, 12416 acres; the fourth, 11908 acres; the fifth, 13239 acres; and the sixth, 6027 acres. How many acres were bought?

50. The rations of beef for an army were, in eight consecutive days, 23942 lb., 21857 lb., 19963 lb., 24721 lb., 20625 lb., 22439 lb., 21358 lb., and 20506 lb. What was the entire quantity consumed?

51. A railroad company's receipts for six months were: $125632, $119847, $134569, $128376, $130003, and $135284. What were the total receipts?

52. Seven villages laid the following numbers of square yards of cement sidewalks: 14169, 15027, 13463, 12945, 14728, 15306, and 14362 square yards. How many square yards were laid in all?

53. The wood from nine clearings measured respectively, 1259, 1068, 1046, 999, 1193, 1275, 1381, 1427, and 1463 cords. What was the total quantity?

54. During the last ten days of an Exposition the attendance was as follows: 28931, 30456, 31947, 28685, 32564, 29723, 30299, 33002, 34278, and 35050. How many attended in all?

55. Write 88888 nine times, and find the sum.

56. Five loads of hay weighed respectively 1960 lb., 2147 lb., 2099 lb., 1875 lb., and 2153 lb. What was the entire weight?

57. An express train ran 520 miles on Sunday; 541 on Monday; 527 on Tuesday; 534 on Wednesday; 553 on Thursday; 567 on Friday, and 575 miles on Saturday. How far did it run during the week?

58. The number of pupils enrolled in the six districts

of a city was as follows: 937, 1001, 895, 1064, 958, and 1049. What was the total enrollment?

59. An Atlantic steamer carried the following numbers of passengers on seven successive trips: 1034, 869, 943, 1075, 999, 847, and 1083. What was the entire number?

60. A merchant's sales for eight months were $2653, $2197, $2741, $2536, $3019, $2482, $2105, and $2267. What was the amount of his sales?

61. The population of a city in 1885 was 38479, and during the next seven years increased as follows: 947, 1013, 1129, 1264, 1381, 1456, and 1547. What was the population in 1892?

62. Seven barges were loaded with the following quantities of coal: 10413 bu., 9857 bu., 11002 bu., 9786 bu., 10628 bu., 10395 bu., and 9999 bu. What was the total number of bushels?

63. The taxable property of six villages was assessed respectively at $348290, $285760, $419580, $376920, $521850, and $349970. What was the entire valuation?

64. Ten carloads of lumber measured respectively 13841 ft., 12999 ft., 15213 ft., 12796 ft., 14625 ft., 13537 ft., 15008 ft., 14742 ft., 13984 ft., and 14720 ft. How many feet were there altogether?

65. A flouring mill's product for twelve consecutive months was 4244 bls., 3961 bls., 4357 bls., 3989 bls., 4256 bls., 4329 bls., 3978 bls., 4305 bls., 4283 bls., 4192 bls., 4150 bls., and 3956 bls. What was the entire product?

66. Seven divisions of an army mustered the following numbers: 15125, 13761, 14289, 13517, 15308, 14126, and 13873 men. What was the entire number?

67. A merchant built a block of stores on a lot worth $10250. He paid $782 for excavating, $3650 for the foundation, $9927 for lumber, $13685 for brickwork,

$11800 for freestone, $4269 for slating, $6231 for plastering, $2568 for painting, $4346 for heating apparatus, $3964 for elevators, $7653 for labor, and $10875 for other expenses. If he sold the property at a gain of $10000, what did he receive for it?

68. The area of the largest ten divisions of the United States is as follows: Texas, 262290 square miles; California, 155980; Dakota, 147700; Montana, 145310; New Mexico, 122460; Arizona, 112920; Nevada, 109740; Colorado, 103645; Wyoming, 97575; Oregon, 94560. What is their total area?

69. The population of the largest ten cities of the United States in 1890 was: New York, 1513501; Chicago, 1098576; Philadelphia, 1044894; Brooklyn, 804377; St. Louis, 460357; Boston, 448477; Baltimore, 434451; San Francisco, 297990; Cincinnati, 296309; New Orleans, 241995. What was the total?

70. The cotton crop of the United States for the ten years beginning with 1880 and ending with 1889 was as follows: 5757397 bales; 6589329 bales; 5435845 bales; 6992234 bales; 5714052 bales; 5669021 bales; 6550215 bales; 6513624 bales; 7017707 bales, and 6935082 bales. What was the entire product?

71. By the census of 1890 the population of New York State was 5981934; of Pennsylvania, 5248574; of Illinois, 3818536; of Ohio, 3666719; of Missouri, 2677080; of Massachusetts, 2233407; of Texas, 2232220; of Indiana, 2189030; of Michigan, 2089792; of Iowa, 1906729. Find the total population of the ten States.

72. In the year 1890 the national debt of France was $4289815222; of Russia, $3669944394; of Great Britain, $3492154855; of Italy, $2246903485; of Austria, $1741035609; of the United States, $1701234668, and of Spain, $1266456840. What was the amount of their indebtedness?

73. A's fortune is $149256, which is $11438 less than B's. C's is $25749 more than B's. If C's is $18957 less than D's, and E's is $92807 more than D's, how much money have they altogether?

74. A grain merchant sold 4923 bu. of corn for 236304 cents; 3856 bu. of wheat for 381744 cents; 6719 bu. of barley for 376264 cents; 7022 bu. of oats for 224704 cents; and 2984 bu. of rye for 256624 cents. How many bushels of grain did he sell, and what amount did he receive?

75. Six village lots cost respectively $1000, $1075, $1150, $1225, $1300, and $1375, and the houses upon them cost $2750, $3000, $3250, $3500, $3750 and $4000. When sold, they realized a profit of $325 on the first; $375 on the second; $425 on the third; $475 on the fourth; $525 on the fifth; and $575 on the sixth. What amount was paid to the owners?

---

# SUBTRACTION.

ARTICLE 26.

1. From 8624 take 7513.
2. From 7348 take 6251.
3. From 54213 take 47424.
4. From 98765 take 56789.
5. From 504030 take 304050.
6. From 5049523 take 1592734.
7. From 7128390 take 2683946.
8. From 45326718 take 36327609.
9. From 62112621 take 43223423.
10. From 36040632 take 6987543.
11. From 200200200 take 97969594.
12. From 878889990 take 868889991.

13. From 1102030405 take 1020304050.
14. From 1001010001 take 202020202.
15. From 2331444255 take 444255537.
16. Take 232425 from 313233.
17. Take 98756 from 200010.
18. Take 639284 from 1000000.
19. Take 1562537 from 7352651.
20. Take 9786459 from 101010101.
21. Take 462783915 from 2001010001.
22. Take 58064293 from 1234567890.
23. Take 43444546 from 515253545.
24. Take 8594637210 from 8687888990.
25. Take 113859407 from 415161710.
26. Take 273541689 from 2735416892.
27. Take 706050403 from 3040506070.
28. Take 3480658284 from 4468312605.
29. Take 1020304050 from 1111111110.
30. Take 7998877665 from 8007006007.
31. What is the difference between one million one thousand and one, and 100010?
32. How much greater is seven hundred thousand and seventy-seven than 668668?
33. How much less is 13 million 13 thousand and 13 than 101101101?
34. How much greater than 454446 is one million ten thousand and one?
35. How much less than 1234567890 is 987654321?
36. What number must be added to 292827268 to make 342101243?
37. To equal 834762519, what number must be subtracted from 1020304050?
38. To what number must 3247683 be added to make 45123750?
39. 24505420 minus 5670765 = what?

40. 2222222222 less 987654332 = how many?

41. Find the difference between one billion, 4 million, 27 thousand and 5, and 100 million 100 thousand 1 hundred and 1?

42. A man was born in 1799, and died on the anniversary of his birth in 1892. How old was he?

43. A merchant having $3451, spent $1963 for dry-goods, and the remainder for groceries. Find the cost of the groceries?

44. A coal-dealer, having 75283 bu. of coal, sold a part, and had 18492 bu. remaining. How much did he sell?

45. A starch-factory consumed 48923 bu. of corn in November, and 55315 bu. in December. What was the difference?

46. Two ships sail for the same port, 4750 miles distant. When the first arrives, the other is 967 miles behind. How far did the second sail?

47. The attendance in the public schools of a city in 1891 was 37245; in 1892, 40104. What was the increase?

48. A's fortune is $125344, which is $18625 more than B's. How much has B?

49. One reservoir contains 361523 bls., which is 73846 bls. more than another contains. What are the contents of the second?

50. A merchant imported goods which he sold at a profit of $7336. If he received $35182 for them, what was the cost?

51. A sugar refinery shipped 210807 lbs. at one time, and 12756 lbs. less at another. What was the weight of the second shipment?

52. The population of the State of Illinois in 1890 was 3818536, and of Ohio 3666719. What was the difference in population?

53. The Cincinnati post-office mailed 241753 letters on Saturday, which was 35665 more than were mailed on Friday. How many were mailed on Friday?

54. 307184 ties were used in building one railroad, and 236625 in constructing another. How many more did the first require than the other?

55. The area of the globe is 196096060 sq. miles, of which 143621181 sq. miles is water. How much land is there?

56. The public debt of Great Britain in 1890 was $3492154855; that of the United States, $1701234668. What was the difference in the debts.

## ADDITION AND SUBTRACTION.

57. $542 + 856 - 1029 + 742 = ?$

58. $3145 - 1278 - 999 + 1962 = ?$

59. $13021 - 7468 + 4567 - 9876 = ?$

60. $78432 - 1098 - 50629 - 19767 = ?$

61. $101010 - 29029 - 2909 - 58971 = ?$

62. From 13462 take the sum of 7258 and 4904.

63. From 31031 take the difference between 21021 and 8018.

64. From the sum of 125423 and 6125 take their difference.

65. Washington was born in 1732; Franklin was born 26 years earlier, and died at the age of 84. In what year did he die?

66. A coal-dealer's stock on November 30 was 12453 bu. He bought 3167 bu. in December, 2856 bu. in January, and 1975 bu. in February. His sales for the same months were respectively 6479, 5866, and 4753 bu. How many bushels had he remaining?

67. A speculator began business with $10425. His

profits for the first year were $4170, and for the second year $1140 less than the first. How much money had he then?

68. A had $11453, and B $4329 more; A gained $2645, and B lost $2934. Which then had the more, and how much more?

69. C has 3072 bu. of corn, which is 987 bu. more than D has. E has 2539 bu. less than C and D together. How many bushels have all?

70. A, B, C, and D inherited a fortune of $100000. A's share was $21625, which was $6250 less than B's; C received $3125 less than B. What was D's share?

71. A grain-dealer having 10431 bu. of wheat, sold 7563 bu., and then bought 514 bu. more than he had left. How many bushels had he then?

72. Smith is worth $13274; Jones, $956 less than Smith; Brown, $1083 more than Jones; and Robinson, $2394 less than Brown. How much have all?

73. A has $1560, which is $467 more than B has. If C has $1306 less than A and B together, how much have all?

74. Four men bought a farm for $10000; the first paid $2150, which was $375 less than the second paid; the third paid $125 less than the second. What did the fourth pay?

75. The population of a city January 1, 1890, was 123450. During the year there were 2469 births, 1976 deaths, 1258 people moved in, and 701 moved away. What was the population January 1, 1891?

# MULTIPLICATION.

ARTICLE 31.

1. $453 \times 3 = ?$
2. $627 \times 4 = ?$
3. $584 \times 5 = ?$
4. $796 \times 6 = ?$
5. $952 \times 7 = ?$
6. $879 \times 8 = ?$
7. $2345 \times 9 = ?$
8. $3689 \times 15 = ?$
9. $4763 \times 24 = ?$
10. $5478 \times 36 = ?$
11. $6392 \times 47 = ?$
12. $7569 \times 58 = ?$
13. $8675 \times 69 = ?$
14. $9999 \times 75 = ?$
15. $23456 \times 83 = ?$
16. $34567 \times 97 = ?$
17. $48739 \times 109 = ?$
18. $56250 \times 256 = ?$
19. $66375 \times 364 = ?$
20. $78549 \times 479 = ?$
21. $87654 \times 587 = ?$
22. $93750 \times 512 = ?$
23. $64512 \times 625 = ?$
24. $75869 \times 729 = ?$
25. $86875 \times 864 = ?$
26. $98089 \times 989 = ?$
27. $5625 \times 4096 = ?$
28. $6542 \times 3786 = ?$
29. $8192 \times 6875 = ?$
30. $7698 \times 7698 = ?$
31. $6789 \times 5432 = ?$
32. $9608 \times 8069 = ?$
33. $3456 \times 8765 = ?$
34. $6789 \times 1728 = ?$
35. $8125 \times 1024 = ?$
36. $6250 \times 2048 = ?$
37. $5120 \times 9375 = ?$
38. $7589 \times 6879 = ?$
39. $8007 \times 7008 = ?$
40. $9876 \times 9067 = ?$

41. Multiply 375625 by 624.
42. Multiply 729729 by 729.
43. Multiply 456789 by 876.
44. Multiply 987654 by 987.
45. Multiply 15625 by 8192
46. Multiply 56789 by 8005.
47. Multiply 98007 by 7854.
48. Multiply 86432 by 9706.

49. Multiply 73536 by 6875.

50. Multiply 9765625 by 1024.

51. What is the value of 125 tons of hay at $16 a ton?

52. If there are 84 bars of soap in one box, how many bars in 108 boxes?

53. What is the value of 387 yds. of cloth at 175 cts. a yard?

54. A regiment of soldiers consumed 2048 lb. of beef daily for 365 days. How many pounds were required?

55. Find the cost of 512 bls. of flour at 625 cts. a barrel.

56. How many bushels of potatoes could be raised on 89 acres at the rate of 109 bu. per acre?

57. A city lot is 296 ft. front, and is valued at $175 per front foot. What is the lot worth?

58. If a pipe discharges 360 gal. in a minute, how many gallons will it discharge in 1440 min.

59. There are 480 sheets in a ream. How many sheets are in 480 reams?

60. A crop of tobacco filled 297 hhds. of 689 lb. each. What was the entire weight?

61. An express train made daily trips between two cities 568 miles apart. How many miles did it run in 365 days?

62. A speculator subdivided a tract of land into 256 building lots, which he sold at $475 each. What did he receive?

63. An edition of an U. S. History comprised 9756 vol. of 897 pages each. What was the total number of pages?

64. A square mile contains 102400 sq. rods. How many square rods are there in 1875 sq. miles?

65. If the water supply for a city averages 345678½ gal. daily, how many gallons would supply it for 359 days?

66. How many ems can a printer set in 49 days of 12 hrs. each, at the rate of 896 ems per hour?

67. 389 acres of corn yielded 68 bu. per acre. If the crop was sold at 57 cts. a bushel, how much was received for it?

68. If a man can plant 1296 hills of corn in a day, how many hills could 32 men plant in 29 days?

69. If a soldier's rations are 48 oz. per day, how many ounces would an army of 21250 men require for 64 days?

70. A wholesale house imported 324 bolts of broadcloth, each containing 39 yds., which was sold at 375 cts. per yard. Find the selling price.

71. 45 cars were each loaded with 625 boxes of starch, weighing 42 lb. to the box. What was the total weight?

72. What is the value of 769 bales of cotton, each weighing 496 lb., at 27 cts. a pound?

73. If a laborer can dig 18 cubic feet of ditch in an hour, how many cubic feet can 97 laborers dig in 69 days of 12 hrs. each?

74. If there are 1250 beans in a quart, how many beans will fill 75 bls., each containing 3 bu., reckoning 32 qts. to the bushel.

75. If a paper-mill manufactures 150 sq. ft. of paper per minute, how many square feet can it manufacture in 52 weeks of 6 days each, allowing 1440 min. to the day?

# SHORT DIVISION.

ARTICLE 41.

1. Divide 5587047 by 3.
2. Divide 1047416 by 4.
3. Divide 18792305 by 5.
4. Divide 28417548 by 6.
5. Divide 37056922 by 7.
6. Divide 51888312 by 8.
7. Divide 68190975 by 9.
8. Divide 4196005 by 5.
9. Divide 69135801 by 7.
10. Divide 31874196 by 4.
11. Divide 53664056 by 8.
12. Divide 48594588 by 6.
13. Divide 100100100 by 3.
14. Divide 211111101 by 9.
15. Divide 283542490 by 7.
16. Divide 459136820 by 5.
17. Divide 899999991 by 9.
18. Divide 567925672 by 8.
19. Divide 5938781754 by 6.
20. What is one fifth of 304000200?
21. What is one seventh of 699214362?
22. What is one fourth of 300250020?
23. What is one ninth of 520775478?
24. What is one sixth of 421805994?
25. What is one eighth of 9876543120?
26. There are four pecks in a bushel. How many bushels are in 2500 pecks?
27. How many five-grain powders can be made from 3750 gr. of quinine?

28. Eight city lots cost $15800. How much was that a piece?

29. A bookkeeper's salary is six dollars a day. In how many days can he earn $1878?

30. Seven boys gathered 68943 chestnuts. What was each one's share?

31. $126180 was divided equally among four heirs. What did each receive?

32. A vintner shipped 38961 gal. of wine in nine-gallon kegs. How many kegs were required?

33. How many six-pound balls can be made from a mass of iron weighing 75804 lb., allowing nothing for waste?

34. 240160 bricks were placed in eight equal piles. How many were in each pile?

35. A company of seven men contracted to furnish 69937 railroad ties. How many did each furnish?

36. Five speculators bought 1250125 ft. of lumber, each paying the same amount. What was each one's share?

37. If a vessel sail nine feet in a second, in how many seconds will it sail 777600 ft.?

38. A merchant imported six cases containing 54594 marbles. What was the average number per case?

39. 878056 passengers were carried over a railroad in eight months. How many was that each month?

40. An ocean steamer sailed 30144 miles in eight regular trips. How far did she sail each trip?

41. A four-horse team drew 43225 lb. of coal in seven loads. What was the average weight per load?

42. The Centennial Exposition at Philadelphia lasted five months, and the total attendance was 9786150. What was the average monthly attendance?

43. If a buggy-wheel passes over nine feet in mak-

ing one revolution, in how many revolutions will it travel 124641 ft.?

44. Coal oil was sold for 149000 cts. at 8 cts. per gallon. How many gallons were sold?

45. A street was paved with 1425600 granite blocks. Allowing six blocks to each square foot, how many square feet were paved?

46. 216972 in. of wire was cut into four-inch nails. How many nails were made?

47. 9 sq. ft. make a square yard. How many square yards are there in 111111111 sq. ft.?

48. A certain number multiplied by seven gave 100110001 for a product. What was the number?

49. If light travels over a distance of 1116000 miles in 6 sec., how far is that per second?

50. The expenses of the Government during the last eight months of the Civil War were $558926496. How much was that per month?

---

# LONG DIVISION.

ARTICLE 42.

*Divide:*

1. 86400 by 25.
2. 145216 by 32.
3. 239645 by 41.
4. 332469 by 53.
5. 479488 by 64.
6. 605550 by 75.
7. 740097 by 81.
8. 297693 by 93.
9. 248136 by 42.
10. 342738 by 54.
11. 1038510 by 66.
12. 2451504 by 48.
13. 2875758 by 79.
14. 5223567 by 87.
15. 7176000 by 96.
16. 4519536 by 56.
17. 6343101 by 69.
18. 5764278 by 78.

19. 5845025 by 85.
20. 9506679 by 97.
21. 4258412 by 109.
22. 1440000 by 256.
23. 22217328 by 324.
24. 43369953 by 583.
25. 37437180 by 786.
26. 80730508 by 945.
27. 10000000 by 625.
28. 82666000 by 837.
29. 20000000 by 640.
30. 97513999 by 987.
31. 87109632 by 3072.
32. 144352063 by 4009.
33. 219476318 by 4567
34. 92160000 by 5625.
35. 468883777 by 6798.
36. 136820361 by 7346.
37. 607807200 by 8096.
38. 761092392 by 9507.
39. 10202111 by 1010.
40. 1000000000 by 512.

41. 18954 bu. of wheat were shipped in 39 carloads. What was the number of bushels in each car?

42. In grading a street 319488 cubic feet of earth was removed by 78 men. How much did each remove?

43. A railroad company paid $600000 for 480 freight cars. What was their average value?

44. An improvement company sold a number of lots for $390625, at the rate of $625 per lot. How many lots were sold?

45. 350240 rails were used in laying 796 miles of track. How many were required for each mile?

46. An author wrote a U. S. History containing 73500 lines in 196 days. What was his average number per day?

47. A tank holds 1864 gal. How many times can it be filled from a reservoir containing 1767072 gal.?

48. The product of two numbers is 778743. One of them is 987. What is the other?

49. $1862000 in gold was placed in sacks, each containing $1750. How many sacks were required?

50. A tract of woodland yielded 70308 cords of wood. If there were 378 acres in the tract, what was the average yield per acre?

51. If the moon is 240000 miles from the earth, in how many days could a pigeon make the trip, at the rate of 640 miles per day?

52. During a certain month a flouring-mill manufactured 550368 lb. of flour, which was put into barrels of 196 lb. each. How many barrels were filled?

53. $180000 was paid for 1250 acres of land. What was the cost per acre?

54. 837 is contained in 472512 a certain number of times, with a remainder. What is the remainder?

55. An army consumed 17793750 lb. of provisions in 365 days. What was its daily allowance?

56. The population of the State of Massachusetts in 1885 was 1945710, which was an average of 234 people to the square mile. What is the area of the State?

57. There are 1760 yds. in a mile. How many miles in 1001440 yds.

58. An army of 120000 men was divided into regiments of 960 men each. How many regiments were formed?

59. In a city school of 512 pupils the expense for tuition for a certain year was 1600000 cts. What was the average expense per pupil?

60. 1728 cu. in. make a cubic foot. How many cubic feet are there in a monument containing 442368 cu. in.?

61. The dividend is 32875187, and the quotient 4793. Find the divisor.

62. A book contains one million ems of type. In how many days could a compositor set it, allowing 6250 ems for a day's work?

63. If iron rails weigh 384 lb. apiece, how many rails would be required for a track whose total weight is 1105920 lb.?

64. 1080000 lb. of cotton were pressed into 2250 bales of equal size. What was the weight of each bale?

65. If a factory consumes 115497 bu. of coal in 313 days, how many bushels will it use daily?

66. Divide ten billions by one thousand and twenty-four.

67. 231 cu. in. make a gallon. How many gallons in 2333331 cu. in.?

68. Eighty-nine laborers earned $48060 in 12 mo. What was the average monthly wages of each?

69. 1925000 bricks were laid by 25 workmen in 28 days. What was an average day's work for each?

70. A planter sold 729 hhds., each containing 63 gal. of molasses, for 2571912 cts. What was its value per gallon?

71. Procter & Gamble loaded 37 cars with 1065600 lb. of soap, allowing 64 lb. to the box. How many boxes did each car hold?

72. A tract of land was subdivided into 196 squares of 12 lots each. If they were sold for $1117200, what was the value of each lot?

73. A tract of woodland yielded 149 cords of wood per acre. The entire quantity was sold for 17164800 cts., at the rate of 450 cts. per cord. How many acres were in the tract?

74. 1250 persons consumed 10000000 oysters in 125 days. How many did each consume daily?

75. An encyclopedia averages 864 pages to the volume, and 144 lines to the page. If the entire number of lines is 3110400, how many volumes are there?

## Article 49.

### Promiscuous Examples.

1. How much more will 143 horses cost, at $77 each, than 367 cows, at $30 each?

2. If 3750 bu. of wheat cost 480000 cts., how many cents will 987 bu. cost?

3. The sum of two numbers is 378, and the greater is 253. What is the product of the two numbers?

4. A has 216 acres, and B 162 acres. If A sells one eighth of his to B, how many will each then have?

5. If a certain number be divided by 592 the quotient will be 468, and the remainder 345. What is the number?

6. Sold 276 cords of wood for 122820 cts., thereby losing 8280 cts. For how much per cord should I have sold it to gain 6900 cts.?

7. A has 168 sheep; B has 3 times as many, less 247; C has 149 more than A and B together. How many have all?

8. A cistern will hold 9900 gal. If it receives 945 gal. per hour by one pipe, and discharges 670 gal. per hour by another, in what time will it be filled?

9. If a certain number be multiplied by 56, and 632 subtracted from the product, the remainder divided by 562 will give 48 for the quotient. What is the number?

10. 296 men have provisions for 145 days. How many men could consume them in 185 days?

11. Two vessels are on opposite sides of the Pacific Ocean, 9936 miles apart. They sail towards each other, one at the rate of 264 miles per day, and the other 288 miles per day. In how many days will they meet?

12. A drover bought an equal number of horses and mules for $14504. He paid $85 for a horse and $63 for a mule. How many of each did he buy?

13. The product of three numbers is 24993360. Two of them are 203 and 304. What is the third?

14. A speculator sold a quantity of pork for $16416, thereby gaining $2592. If he received $19 a barrel for it, what was the cost per barrel?

15. A contractor agreed to construct a building which would employ 104 men 147 days; 13 of the men failed to come. How long were the others employed?

16. How many sacks of coffee, each weighing 250 lb., at 17 cts. a pound, are equal in value to 68 chests of tea, of 35 lb. each, at 75 cts. a pound?

17. A vessel sailed 12288 miles in 64 days. At that rate, how far could it sail in 75 days?

18. 956 bls. of flour, each containing 196 lb., were emptied into 28-pound sacks, and sold at $1 per sack. How much was received?

19. A drover paid $11232 for Texas cattle at $13 per head; 35 strayed away, and 46 were drowned in crossing a stream. At what price per head must he sell the remainder to clear $2862 on the cost of all?

20. What was the cost of 256 acres of land, if $3336 was gained by selling 139 acres for $13761?

21. Divide the product of 2304 and 1296 by the difference between 100000 and 98272.

22. A planter sold 468 hhds. of tobacco at $127 each. He then borrowed enough money to enable him to buy 796 bales of cotton at $82 a bale. How much did he borrow?

23. If 287 bls. of wine cost $13776, how many could be bought for $12912?

24. Paid $15232 for horses at $64 each; 14 were stolen, and the others were sold at $68 apiece. What was my gain or loss?

25. Two men engaged in business, each with $10750.

One gained $2250 a year for three years; the other lost $250 a year for the same time. How much more was one then worth than the other?

**26.** If 109 be added to a certain number, the sum multiplied by 513, 3591 subtracted from the product, and the remainder divided by 912, the result will be 432. What is the number?

**27.** A market gardener planted 539 rows of cabbages with 396 to each row. Had he planted 462 in a row, how many rows would there have been?

**28.** A street whose area is 31680 sq. yds. was paved with granite blocks costing 12 cts. apiece. If the entire cost was 17107200 cts., how many blocks were there in each square yard?

**29.** If 63 men can husk 114219 bu. of corn in 49 days, how many bushels can 56 men husk in 48 days?

**30.** 200000 lemons were packed in boxes, and sold for 550000 cts., at the rate of 440 cts. per box. How many lemons were in each box?

**31.** Five brothers inherited a fortune. A's share was $22750; B's, $3125 less than A's; C's, $1250 more than B's; D's, $3125 less than C's; E's, $1250 more than D's. What was the entire fortune?

**32.** John graduated from college at the age of 22. His mother was born in 1842, and his father is four years older than his mother. If the father was 27 years old when John was born, in what year did he graduate?

**33.** A speculator exchanged 245 acres of farm land, worth $75 an acre, for 356 acres of woodland and $1287 in money. What was the value of the woodland per acre?

**34.** A race-track 5280 ft. in circumference is surrounded by a fence containing 42240 sq. ft. of boards. The boards were sawn from a certain number of logs, each measuring 768 sq. ft. How many logs were used?

35. A company of 64 men mined 1125000 oz. of silver during a certain year. It was taken to the mint and made into dollars, each weighing one ounce. If one ninth the entire amount was charged for coining, what did each man realize?

36. Sold 2048 bu. of wheat for 249856 cts., thereby losing 3 cts. per bushel. If I had sold it at a gain of 20480 cts., how much per bushel would I have received?

37. A trader paid $32760 for horses at $78 apiece. He sold a part of them for $23205 at $85 each, and the remainder at $65 each. What did he gain or lose by the transaction?

38. What was the cost of 296 acres of land, if $1435 was gained by selling 247 acres for $19219?

39. A dealer bought 26 carloads of coal, of 285 bu. each, at 9 cts. a bushel. The expense for freight was 550 cts. per car, and one cent per bushel for hauling. If he sold it all at 15 cts. per bushel, what was his profit?

40. How many boxes of eggs, each containing 13 doz., worth 18 cts. a dozen, should be exchanged for 27 bls. of coal oil, each holding 39 gals., at 14 cts. a gallon?

41. Thirty-six acres of land yielded 125 bu. of potatoes per acre. The crop was sold at 48 cts. a bushel, and the money invested in land at 27 cts. a square rod. Allowing 160 sq. rods to the acre, how many acres were bought?

42. Four men formed a partnership with a capital of $25000. A's share was $5625; B's was $1625 more than A's, and C's $375 less than B's. What was D's share?

43. Bought 64 bls. of wine, and sold it at a profit of 25 cts. a gallon, thereby gaining 72000 cts. How many gallons were in each barrel?

44. A speculator sold 34 village lots at $570 each,

and invested the money in an equal number of horses at $69, and mules at $45 apiece. How many of each did he buy?

45. A gambler lost $2750. He then won $3470, spent $4895, borrowed $2550, and found that he had $10000. What had he at first?

46. If 27 men can dig a mill-race in 49 days, by working 10 hours a day, how many more men could do the same work in 35 days, by working 9 hours a day?

47. Three brothers, A, B, and C, inherited respectively $12500, $15375, and $11500. B gave $4750 to C, who gave $3125 to A, who gave $2500 to B. How much had each then?

48. There are 2000 lb. in a ton. Allowing 56 horseshoe nails to a pound, how many companies of cavalry would require five tons of nails for shoeing their horses, allowing 100 men to each company, and 32 nails to each horse?

49. If 13988 be added to a certain number, 429 will be contained in the sum 375 times, with a remainder; and if this remainder be multiplied by 456, the product will be 142272. What is the original number?

50. Twenty-five men built a factory in 52 days, each laying 1800 bricks per day. If the bricks were hauled by 16 teams, and there were 975 bricks in each load, how many loads did each team haul?

# UNITED STATES MONEY.

ARTICLE 53.

*Write the following sums:*

1. Twenty-five dollars and thirty-seven cents.
2. Fifty-six dollars and seventy-five cents.
3. Thirty-two dollars, ninety-one cents and eight mills.
4. Ten dollars and one cent.
5. One hundred and forty-three dollars and sixty-seven cents.
6. Nine hundred dollars and nine mills.
7. Seven hundred and eighty-one dollars five cents and six mills.
8. Five hundred dollars and five cents.
9. Eight hundred and ninety-five dollars and ninety-nine cents.
10. One thousand and one dollars and one mill.

*Read the following:*

| | | | |
|---|---|---|---|
| $10.75 | $75.50 | $200.02 | $606.06 |
| $16.075 | $87.625 | $234.567 | $654.321 |
| $29.111 | $89.05 | $356.653 | $700.00 |
| $31.002 | $91.00 | $371.001 | $711.11 |
| $33.333 | $99.999 | $398.009 | $790.092 |
| $48.01 | $100.01 | $401.25 | $818.181 |
| $50.10 | $125.125 | $450.00 | $846.13 |
| $67.004 | $158.003 | $469.77 | $875.643 |
| $70.00 | $164.07 | $555.555 | $909.909 |
| $72.063 | $175.571 | $500.005 | $1000.001 |

## Article 55.

### Reduction of United States Money.

1. Reduce $75 to cents.
2. Reduce 1500 cents to dollars.
3. Reduce 99 cents to mills.
4. Reduce 625 mills to cents.
5. Reduce 88 dimes to cents.
6. Reduce $50 to mills.
7. Reduce 18375 mills to dollars.
8. Reduce $83.45 to cents.
9. Reduce $321 to mills.
10. Reduce $1000 to cents.
11. Reduce 100 dollars 10 cents 1 mill to mills.
12. Reduce 86400 mills to dollars.
13. Reduce $75 7 cents 5 mills to mills.
14. Reduce 100000 mills to dollars.
15. Reduce $15625 to cents.
16. Reduce 156250 cents to dollars.
17. Reduce $50 50 cents 5 mills to mills.
18. Reduce 100001 mills to dollars.
19. Reduce $90 90 cents, 9 mills to mills.
20. Reduce 150005 cents to dollars.
21. Reduce $1000 to mills.

## Article 56.

### Addition of United States Money

1. Find the sum of 13 dollars and 49 cents; 15 dollars and 22 cents; 21 dollars and 16 cents; 24 dollars and 75 cents; and 25 dollars and 38 cents.

2. Add $10.10, $12.21, $23.32, $34.43, $45.54, $56.65, $67.76, $78.87, $89.98, and $90.19.

3. $5.05 + $55.50 + $50.005 + $5.55 + $50.505 + $55.55 + $5.50 + $50.555 + $50.00 + $5.005 = what?

4. A merchant's sales for six days were as follows: $168.73, $150.01, $179.42, $145.86, $162.23, $193.75. What were his entire receipts?

5. The expenses of a school district for ten months were as follows: $140.65, $137.50, $159.24, $175.96, $170.13, $166.49, $131.10, $143.07, $150.36, and $125.50. What amount was expended?

6. Eight carloads of wheat were sold for the following sums: $428.79, $399.54, $436.23, $388.75, $425.11, $384.67, $438.46, and $431.78. What was the entire value?

7. A man built a house, paying $379.65 for lumber, $125.50 for stone-work, $57.60 for brick-work, $147.25 for plastering, $66.85 for painting, $150.40 for labor, $31.75 for grading, and $41 for other expenses. What was the cost of the house?

8. Nine laborers earned the following sums in one year: $510.75, $491.33, $513.91, $488.64, $504.47, $497.58, $502.89, $475.72, and $518.16. What were their total earnings?

9. Seven invoices of goods were sold respectively for $1200.51, $807.69, $1110.10, $648.18, $1000, $764.27, and $999.15. How much was realized from the sales?

10. The receipts of a church fair for six consecutive days were $120.66, $112.92, $131.48, $150.79, $140.53, and $200.20. What were the total receipts?

11. The gatherings of a company of miners for eight weeks amounted respectively to $500.39, $163.10, $468.11, $752.96, $689.14, $300.28, $847.37, and $249.59. What was the entire value?

12. Seven ingots of gold assayed each as follows: $621.934, $616.429, $618.537, $620.758, $617.845, $619.286, $625.211. What was the total value?

13. Seven boatloads of corn were sold respectively for $720.45, $691.50, $750.25, $675.85, $740.60, $695.15, and $726.20. What sum was realized?

14. The receipts of nine excursion trains were returned as follows: $210.95, $195.65, $241.50, $229.85, $198.25, $300.15, $271.30, $254.45, and $248.40. What were the total receipts?

15. The taxes of a certain village for ten consecutive years were: $1603.818, $1729.215, $1837.68, $1924.007, $1999.99, $2065.623, $2126.25, $2205.476, $2248.09, $2259.851. What amount of tax was assessed?

## Article 57.

### Subtraction of United States Money.

1. From $134.51 take $75.48.
2. From $175.30 take $87.65.
3. Take $46.36 from $96.35.
4. Take $69.83 from $125.
5. Subtract $385.98 from $500.05.
6. From $625.625 subtract $575.125.
7. What is the difference between 700 dollars and 700 cents?
8. $1000 — $987.65 = ?
9. $505.05 less $444.44 = ?
10. $1456.77 minus $456.78 = what?
11. A man purchased $49.15 worth of goods, and gave a $100 bill in payment. How much change did he receive?
12. Sold a horse for $130.75, which was $20.25 more than I paid for him. Find cost.
13. A speculator commenced trading with $2180, and quit with $1775.50. How much did he lose?
14. A trader's profits for a certain year were $1560.80,

and he then had $4140. How much had he at the beginning of the year?

15. A drover sold a herd of cattle for $1625.50, which cost him $1425.50. Find his gain.

16. By selling a lot of lumber for $2531.73, a dealer gained $329.15. What would he have gained by selling it for $2500?

17. A had $1549.80, B had $1395.35; A spent $460.95, and B spent $406.50. How much more than B did A then have?

18. $3000 — $330.30 — $440.40 — $550.50 — $660.60 — $770.70 = what?

19. A sold B a watch, and gained $11.75; B sold it to C for $75, and gained $13.25. How much did the watch cost A?

20. A man, dying, left to his widow $2150.25, which was $339.75 more than he left to his son. The daughter's share was $309.75 less than the son's. How much did the son and the daughter each receive?

ARTICLE 58.

## Multiplication of United States Money.

1. Multiply $10.625 by 16.
2. Multiply $15.864 by 25.
3. Multiply $22.875 by 32.
4. Multiply $37.25 by 49.
5. Multiply $43.125 by 56.
6. Multiply $15.625 by 64.
7. Multiply $25.432 by 75.
8. Multiply $44.375 by 444
9. Multiply $32.216 by 875.
10. Multiply $1953.125 by 512.
11. Find the cost of 88 sheep at $3.75 each.

12. Bought 124 bu. of corn at $0.625 per bushel. What did I pay for it?

13. Paid $4.80 a barrel for 36 bls. of flour. What was the entire cost?

14. Sold 48 horses at $56.25 per head. What did I receive for them?

15. A farmer sold 250 bu. of potatoes at $0.875 a bushel. What was their value?

16. A dealer bought 420 gal. of wine at $1.375 a gallon. What did he pay for it?

17. A fruiterer paid $2.75 a barrel for 125 bls. of apples. What was the total cost?

18. A publisher sold 240 sets of Ridpath's Histories at $18.75 a set. What was their value?

19. 16840 feet of lumber, worth $0.035 a foot, was used in building a house. Find the cost.

20. A coal merchant ordered 10750 bu. of coal at $0.084 a bushel. What was the bill?

21. 168960 sq. ft. of stone sidewalk, worth $0.175 a square foot, was laid in a certain village. How much was paid for it?

22. Sold a farm of 160 acres at $62.50 an acre. What was received for it?

23. Find the value of six piles of wood, each containing 24 cords, at $4.25 a cord.

24. A merchant imported 25 bolts of silk of 50 yds. each, at $1.10 a yard. Find the cost.

25. A laborer worked 48 days of 9 hrs. each, at $0.125 an hour. How much did he earn?

26. Find the cost of 15 reams of foolscap, each containing 480 sheets, at 5 mills per sheet.

27. A manufacturer sold 100 boxes of soap, each containing 60 bars, at $0.075 a bar. How much did he realize?

28. A fruit-dealer bought 125 boxes of oranges, each containing 12 doz., at 22 cts. 5 mills per dozen. What did he pay for them?

29. A tobacco firm received an order for 84 caddies of tobacco of 45 lb. each, at 55 cts. a pound. What was the amount of the bill?

30. A wholesale grocer imported 240 sacks of Java coffee, each holding 150 lb., at a cost of 17 cts. 5 mills per pound. What was the value of the coffee?

31. Five carpenters built a house in six weeks, working six days each week. If their wages were $2.25 apiece per day, what were their total earnings?

32. A jeweler sold 50 gold rings, each weighing 6 pwt., at $1.125 a pwt. How much did he receive for them?

33. A druggist compounded 120 boxes of pills; each box contained 25 pills, weighing 10 gr. apiece, and were sold at the rate of 2 mills per grain. Find their value.

34. A ship with a crew of 125 men sailed on a ten months' cruise. If each man was allowed 40 lb. of beef per month, what was the entire cost at $0.045 per pound?

35. Eight carloads of sugar, each containing 75 bls., of 200 lb. to the barrel, were sold at 5 cts. a pound. How much was paid for the sugar?

36. Five tracts of land were each subdivided into 40 lots. The lots were 50 ft. wide, and were sold for $7.50 per front foot. How much was realized?

37. A merchant imported 44 cases of brandy, each containing 12 two-quart packages. If he paid $1.375 a quart, what was the cost of the consignment?

38. 987 cavalry horses were each allowed a peck of corn daily for 30 days. If the corn cost 12 cts. 5 mills per peck, what was the expense of feeding them?

39. 16 carloads, each containing 625 boxes of starch,

were sold at $0.055 per pound. If each box contained 8 four-pound packages, what amount was received for all?

40. A company of 12 gold-miners worked 8 hours a day for 150 days. If each one's gatherings averaged 50 gr. per hour, what was the total value at 5 cts. per grain?

### Article 59.

### Division of United States Money.

1. Divide 4375 cents by 25 cents.
2. Divide 14112 mills by 36 mills.
3. Divide $203.84 by 49 cents.
4. Divide $4440 by 96 cents.
5. Divide $800 by $1.28.
6. Divide $4473.63 by $5.67.
7. Divide $224 by 25 cents 6 mills.
8. Divide $1001.25 by $4 and 5 mills.
9. Divide $960 by $1 87 cents 5 mills.
10. Divide $1100 by $3.125.
11. Divide $603.33 by 39.
12. Divide $103.872 by 48.
13. Divide $1000 by 32.
14. Divide $2441.04 by 56.
15. Divide $681.444 by 69.
16. Divide $1248 by 75.
17. Divide $4418.75 by 175.
18. Divide $480 by 256.
19. Divide $3221.90 by 725.
20. Divide $2342.655 by 999.
21. How many bushels of potatoes, at 68 cts. a bushel, can be bought for $85?
22. How many pounds of lard, at 7 cts. 5 mills a pound, will cost $12?

23. A man paid $2100 for a farm, at the rate of $43.75 per acre. How many acres were in the farm?

24. Bought a quantity of coal-oil at 22 cts. 5 mills per gallon, for which I paid $373.50. How many gallons did I buy?

25. If turkeys sell for $1.125 each, how many can be bought for $90.

26. If a carload of freight costs $0.175 per mile, how far could it be carried for $26.25.

27. At 27 cts. a cubic yard, how many cubic yards of earth could be removed for $196.83?

28. How many feet of lumber, at 2 cts. 5 mills a foot, will cost $337.50?

29. Paid $15.84 for 96 doz. eggs. What was one dozen worth?

30. A dealer bought 144 base-balls for $90. What was the cost of each?

31. 840 cans of peaches cost $231. What was the cost per can?

32. If 750 boxes of Havana cigars were sold for $9375, what was the price per box?

33. A paper-mill consumed in one year 939 tons of straw, for which $4225.50 was paid. What was the average cost per ton?

34. During a certain month the Government purchased 1320 horses, for which $89100 was paid. What was the average cost per head?

35. Fifteen boxes of baking powder, each containing 32 packages, were sold for $24. What was the price per package?

36. A merchant imported 12 casks of wine, for which he paid $2079, at the rate of $2.75 a gallon. How many gallons were in each cask?

37. A wholesale grocer sold a lot of pickles for

$302.40, at the rate of 15 cts. per quart. If there were 12 two-quart jars in each case, how many cases were sold?

38. A quantity of starch was packed in boxes, each containing 8 four-pound packages, and sold at $0.045 per pound. If $180 was received for it, how many boxes were there?

39. Seventy-five laborers were employed for 45 days, and their wages amounted to $5906.25. How much did each earn per day?

40. The expense of maintaining a company of soldiers for 60 days was $4500. If the allowance of each was 62 cts. 5 mills daily, how many were in the company?

### Article 60.

### Promiscuous Examples.

1. A merchant's sales for one week were as follows: on Monday, $219.72; on Tuesday, $243.53; on Wednesday, $290.42; on Thursday, $230.95; on Friday, $196.50; and on Saturday, $318.88. What was the amount of his sales?

2. Five men bought a cargo of lumber for $4750. The first paid $840.30; the second, $1000.50; the third, $769.75; the fourth, $1150. What did the fifth pay?

3. A grain-dealer sold 750 bu. of wheat at $1.125 a bushel; 1240 bu. of corn at $0.375 a bushel, and 1560 bu. of barley at $0.625 a bushel. What did he receive for all?

4. If flour is $4.75 a bl., and apples $2.40 a bl., how many barrels of each can be bought for $171.60?

5. Paid $43.75 for a carpet, and four times as much for furniture, what was the cost of all?

6. Spent $7.25 for groceries; $13.50 for a stove;

$3.75 for shoes; $17.75 for a suit of clothes, and $6.25 for a lawn-mower. How much was left out of a fifty-dollar bill?

7. Sold a lot of grain for $1053.75, losing $84.30. What would have been gained by selling it for $1300?

8. Sold 84 bls. of potatoes for $134.40, thereby losing $12.60. What was the cost per barrel?

9. A merchant imported 15 cases of silk, each containing 12 bolts of 60 yds. per bolt. What did it cost at $1.375 per yard?

10. A man lost $37.90; he then borrowed $26.75, spent $75.50, and had $13.35 left. How much had he at first?

11. Bought 35 bls. of molasses for $756, at the rate of 45 cts. a gallon. How many gallons were there in each barrel?

12. Exchanged 64 bales of cotton, each weighing 210 lbs., at 25 cts. a pound, for molasses at $19.20 a bl. How many barrels did I receive?

13. A farmer sold an equal number of bushels of wheat, rye, and oats for $135. He sold the wheat at $0.875 a bushel, the rye at $0.625, and the oats at $0.375. How many bushels of each were sold?

14. A merchant bought a number of barrels of flour for $531.25, and sold it for $5.50 per barrel, thereby gaining $156.25. How many barrels did he buy?

15. A trader having $5000, bought 35 horses at $68 per head, 52 cows at $27.50 per head, 96 hogs at $5.25 each, and spent the remainder for sheep, at $3.50 apiece. How many sheep did he buy?

16. Bought 160 acres of land for $14000, and sold a part for $9000, at $75 an acre, and the remainder at $125 an acre. How much did I gain or lose by the transaction?

17. A merchant having $1500, spent $560.30 for dry-goods, $770.50 for groceries, and the remainder for sugar, at $0.045 a pound. How many pounds did he buy?

18. Sold 56 horses for $4340, thereby gaining $12.50 on each. What was the cost per head?

19. If 36 horses cost $2475, for how much per head must they be sold to gain $6.25 per head?

20. Bought 48 acres of land for $2700, and sold 32 acres for $2000. How much did I gain on the quantity sold?

21. A, B, C, and D bought a factory for $14000. A paid $3750; B paid $625 less than A, and C paid $750 more than B. How much did D pay?

22. The gravel for a public road cost $1012.50, at 3 cts. a cubic foot. If there were 27 cubic feet in each load, how many loads were hauled?

23. A farmer sold 75 bls. of apples at $2.40 a barrel, and a lot of potatoes at $0.875 a bushel. If he received $250 for all, how many bushels of potatoes had he?

24. Paid $1806 for cattle at $21.50 per head, and sold them at $18.75 per head. Find my loss.

25. For how many days of eight hours each must a laborer work to earn $436.80, at $0.175 an hour?

26. Bought 48 bls. of cider, and sold it at a profit of $0.075 per gal., thereby gaining $162. How many gallons were in each barrel?

27. 36 bls. of molasses cost $594. If it was sold for 45 cts. a gallon, and there were 44 gal. in each barrel, how much was gained?

28. A speculator sold 16 village lots at $350 each, and invested the money in an equal number of horses at $55, and cows at $32.50 apiece. How many of each did he buy?

29. Bought a tract of land for $7200, and sold it for $62.50 an acre, thereby gaining $800. How many acres were in the tract?

30. Bought wine at $1.70 a gallon. Sold it at a profit of $0.55 per gallon, and received $315 for entire quantity. What was the number of gallons?

31. If 27 men earn $992.25 in a certain time, how much can 39 men earn in the same time?

32. There are 160 sq. rods in an acre. If 20 sq. rods will produce 12 bu. of potatoes, what will be the value of the crop produced on 15 acres at 60 cents per bushel?

33. Bought 25 bales of cotton for $750, at the rate of 12 cts. 5 mills per pound, what was the average weight of each bale?

34. If 37 men can earn $6216 in 16 weeks, how much can 45 men earn in 24 weeks?

35. How many boxes of oranges, each containing 12 doz., worth 30 cts. per dozen, should be given in exchange for 32 bls. of apples, each containing 3 bu., at 75 cts. per bushel?

36. At what price per acre must 108 acres of land be bought, that $675 may be gained by selling it for $8100?

37. How many barrels of sugar, each containing 180 lbs., worth $0.055 per pound, must be given for 29 cords of wood at $4.25 a cord, and $45.05 in money?

38. A coal-dealer ordered 25 carloads of coal, of 320 bu. each, at 8 cts. 5 mills per bushel. The expense for freight was $6.25 per car, and one cent per bushel for hauling. If he sold it all at $0.125 per bushel, what was his profit?

39. A farmer sold 720 bu. of oats at $0.475 a bushel, and received in exchange 8640 ft. of lumber at $0.025 a foot, and the remainder in sheep at $3.15 each. How many sheep did he receive?

40. Forty-eight acres of meadow yielded three tons

of clover per acre. The crop was sold at $9.60 a ton, and the money invested in land at 54 cts. a square rod. Allowing 160 sq. rods to the acre, how many acres were bought?

41. A merchant bought four barrels of molasses, each containing 45 gal., at 35 cts. a gallon; but 12 gal. having leaked out, at what price per gallon must he sell the remainder to gain $21 on the entire cost?

42. A poulterer bought an equal number of turkeys at 90 cts., geese at 75 cts., ducks at 35 cts., and chickens at 25 cts. each. He sold the entire lot for $281.25, thereby gaining $56.25. How many of each were there?

43. Sold 1600 bu. of wheat for $1728, thereby losing $32. If I had sold it at a gain of $40, how much per bushel would I have received?

44. If $250 be added to my money, the sum multiplied by 12, and $3000 subtracted from the product, the remainder divided by 25 will equal $480. How much have I?

45. A man can earn $0.275 an hour, and his son $0.15. If they receive $25.50 for doing a certain work, what is the man's share?

46. C and D built a fence for $43.20; C worked 10 days, and built 80 rods; D worked as many days as C built rods per day. What should each receive?

47. What was the cost of 1875 bu. of coal, if $9.60 was lost by selling 640 bu. at 10 cts. 5 mills per bushel?

48. A drover bought 320 hogs for $1440, but 16 having died, at what price per head must he sell the others to gain $156 on the whole transaction?

49. Paid $7975 for land at $55 an acre, sold a part of it for $3625 at $62.50 an acre, and the remainder at $50 an acre. What did I gain or lose?

50. 96 men were employed upon a railroad for a certain time, and their wages at $1.65 per day each

amounted to $15681.60. How many days did they work?

51. One pound of gold contains 5760 gr. The American half-eagle weighs 129 gr., and its value is five dollars. What is the value of 43 lb. of standard gold?

---

# REDUCTION.

ARTICLE 63.

## Dry Measure.

1. Reduce 5 bu. 3 pks. 2 qts. 1 pt. to pints.
2. Reduce 10 bu. 1 pk. 1 pt. to pints.
3. Reduce 25 bu. 7 qts. to pints.
4. Reduce 50 bu. 1 pt. to pints.
5. Reduce 75 bu. 2 pks. 7 qts. to quarts.
6. Reduce 999 bu. 3 pks. 7 qts. 1 pt. to pints.
7. Reduce 100000 qts. to bushels.
8. Reduce 10000 pts. to pecks.
9. Reduce 309 pts. to bushels.
10. Reduce 125625 pts. to bushels.
11. Reduce 127799 pts. to bushels.
12. Reduce 3661 qts. to bushels.
13. A fruit dealer sold 15 bu. of strawberries at 5 cts. a pint. What did he receive for them?
14. Bought 3 bu. 2 pks. 1 qt. of plums at 6 cts. a quart. What did I pay for them?
15. Find the cost of 40 bu. 3 pks. 1 qt. of wheat at 2 cts. a pint.
16. $9.90 was paid for blackberries at $0.075 a quart. What quantity was bought?
17. 100 bu. of peaches were packed in boxes, each holding 2 pk. 4 qts. How many boxes were required?

18. A lot of tomatoes was shipped in 264 baskets, each containing 1 pk. 4 qts. How many bushels were there?

19. 45 bushels of pears were preserved in 3-pint jars, which were sold at $2.50 per dozen. How much was received for them?

20. A canning establishment received an order for 50 boxes of assorted canned fruits, each box containing 2 doz. two-quart cans. How many bushels were required?

## Article 64.

### Liquid Measure.

1. Reduce 33 gal. 3 qts. 1 pt. 1 gill to gills.
2. Reduce 50 gal. 2 qts. 3 gills to gills.
3. Reduce 75 gal. 1 pt. to pints.
4. Reduce 99 gal. 3 qts. 1 pt. 3 gills to gills.
5. Reduce 250 gal. 1 qt. to pints.
6. Reduce 3200 gills to gallons.
7. Reduce 3565 gills to gallons.
8. Reduce 9999 pts. to gallons.
9. Reduce 10001 gills to gallons.
10. Reduce 12625 pts. to hogsheads.
11. Reduce 37 hhds. 31 gal. 2 qts. to gills.
12. A wine merchant sold 37 gal. 2 qts. of sherry at $0.045 per gill. What was its value.
13. A grocer bought 10 bls. of coal-oil, each containing 40 gal., at $0.015 a pint. How much did he pay for it?
14. Find the cost of 125 gal. of vinegar at 5 mills per gill.
15. Bought 200 gal. of molasses at 5 cts. a pint, and sold it at 12 cts. a qt. Find my gain.
16. 1080 gal. of beer was drawn into one-pint bot-

tles, which were sold at 50 cts. per dozen. How much was received?

17. Paid $312.50 for Jamaica rum, at $6.25 a gallon, and sold it at $0.225 per gill. How much was gained?

18. Sold an invoice of patent medicines in half-pint bottles at 75 cts. each, thereby realizing $300. How many gallons were sold?

19. $1800 was paid for a carload of 240 boxes of oysters, each box containing two dozen one-quart cans. What was the price per gallon?

20. $64.80 was lost by selling a quantity of maple syrup for $583.20, at $0.135 per pint. If each barrel contained 36 gal., what was the cost per barrel?

## Article 65

### Avoirdupois Weight.

1. Reduce 2 tons 19 cwt. 99 lb. to pounds.
2. Reduce 10 tons 10 cwt. 10 lb. 10 oz. to ounces.
3. Reduce 9 cwt. 99 lb. 9 oz. to ounces.
4. Reduce 40 tons 50 lb. to pounds.
5. Reduce 15 tons 15 lb. 15 oz. to ounces.
6. Reduce 125625 lb. to tons.
7. Reduce 31999 oz. to hundredweights.
8. Reduce 101010 lb. to tons.
9. Reduce 1010001 oz. to tons.
10. Reduce 369787 oz. to tons.
11. A load of hay weighing 1 ton 3 cwt. 75 lb. was sold at the rate of $0.008 per pound. What was received for it?
12. If a cubic foot of marble weighs 180 lb., and is worth $5, what would be the value of a block weighing 13 tons 10 cwt.?
13. If wheat weighs 60 lb. to the bushel, how many

wagonloads of 25 bu. each would be required to haul 15 tons of wheat?

14. 90 tons of starch was packed in boxes, each containing 8 four-pound packages, and sold at $1.60 a box. What was the entire value?

15. Ten carloads of anthracite coal were sold at the rate of $6.25 per ton. Reckoning 25 bu. to the ton, and 400 bu. to the car, what was the value of all?

16. 1000 boxes, each containing 32 one-pound packages, were shipped in a car from Boston to Cincinnati. What was the net weight of the carload?

17. A wholesale merchant bought 125 boxes of soap, each containing 50 two-pound bars. What was the weight of the soap?

18. There are 5280 feet in a mile. If steel rails weigh 18 lb. to the foot, what would be the weight of the rails in one mile of railroad?

19. $800 was received for a quantity of baking-powder, which was packed in four-ounce boxes, and sold at 10 cts. a box. What was the weight of the entire lot?

20. A barrel of beef weighs 200 lb. Find the value of the beef required by a regiment of 1000 men for 30 days, beef being worth $15 a barrel, and allowing each man 1 lb. 8 oz. daily.

## ARTICLE 66.

### Long Measure.

1. Reduce 125 miles 125 rods to rods.
2. Reduce 1000 yds. 2 ft. 10 in. to inches.
3. Reduce 1760 yds. to inches.
4. Reduce 31 miles 80 rods to rods.
5. Reduce 1543 yds. 7 in. to inches.

6. Reduce 56700 in. to yards.

7. Reduce 24111 rods to miles.

8. Reduce 63359 in. to yards.

9. Reduce 264000 ft. to miles (1 mile = 1760 yds.).

10. Reduce 950400 in. to miles.

11. If a horse can trot 64 rods per minute, in what time can he trot five miles?

12. What would be the value of 100 miles of telegraph wire at $0.005 per foot?

13. In the above question, if the telegraph poles are 150 feet apart, what would be their value at $1.25 each?

14. A fence extends along both sides of a railroad 75 miles in length. Find the cost of the fence at $0.50 a rod.

15. The cement sidewalks of a certain village have a total length of 12 miles. Find their cost at 75 cents a linear foot.

16. If sound travels at the rate of 1100 ft. per second, what time would elapse between seeing a flash of lightning and hearing thunder from a cloud 10 miles distant?

17. $84.48 was paid for three-inch nails at $0.002 each. What length of wire was required?

18. Twelve silk flags, exactly alike, cost $194.40, at the rate of 15 cts. per linear inch. What was the length of each flag?

19. A weekly newspaper has a circulation of 120000. If each copy is 5 ft. 6 in. in length, how far would the entire issue extend in a straight line?

20. A submarine cable across the Atlantic Ocean cost $2200000 at the rate of $0.50 a yard. What is the length of the cable?

## ARTICLE 67.

### Square Measure.

1. Reduce 75 acres 75 sq. rods to square rods.

2. Reduce 30 sq. yds. 2 sq. ft. 36 sq. in. to square inches.

3. Reduce 5 sq. miles 237 acres 135 sq. rods to square rods.

4. Reduce 888 sq. yds. 8 sq. ft. 88 sq. in. to square inches.

5. Reduce 15 acres to square feet (1 acre = 43560 sq. ft.).

6. Reduce 100000 sq. rods to acres.

7. Reduce 37625 sq. in. to square yards.

8. Reduce 1040100 sq. rods to square miles.

9. Reduce 1089000 sq. ft. to acres.

10. Reduce 34848000 sq. ft. to square miles.

11. A parlor is 30 ft. long and 18 ft. wide. What is the area of its floor?

12. A garden is 20 rods long and 16 rods wide. How many acres does it contain?

13. A ceiling is 48 ft. long and 33 ft. wide. Find cost of painting it, at $0.20 a square yard.

14. A pasture is 45 rods long and 32 rods wide. What is its value, at $75 an acre?

15. Find the cost of polishing a granite slab 2 ft. long and 3 ft. wide, at one cent a square inch.

16. A platform is 25 yds. long and 12 yds. wide. What is it worth, at $0.05 a square foot.

17. A floor 32 ft. long and 18 ft. wide was laid with marble tiles six inches square, at 20 cts. each. What was the cost of the floor?

18. A board fence eight feet high surrounds a base-ball lot 600 ft. square. What is the value of the fence, at $2.50 per 100 sq. ft.

19. A field 45 rods wide cost $1080, at $60 an acre. What was its length?

20. The carpeting of an assembly-room cost $210, at $0.875 a square yard. If the room was 60 ft. long, how wide was it?

ARTICLES 68 AND 69.

## Rectangles.

1. A room is 18 ft. long and 14 ft. wide. How many square yards in the floor?

2. A parlor is 21 by 15 ft. Find the cost of carpeting it, at $1.20 a square yard.

3. The floor of a dining-room is 33 ft. long and 24 ft. wide. Find cost of painting it, at 22 cts. 5 mills a square yard.

4. An assembly room is 57 ft. long by 39 ft. wide. What would be the cost of the ceiling, at $0.25 a square yard.

5. A church is 66 ft. in length by 48 ft. in width, and 21 ft. high. What would it cost to paint the outside walls, at 27 cts. 5 mills a square yard?

6. A concert-room is 69 ft. long, 45 ft. broad, and 18 ft. high. Find the cost of plastering it, at 25 cts. a square yard.

7. A lot is 50 rods long and 32 rods wide. Find its value, at $100 per acre.

8. A farm is rectangular in form, 75 rods wide and 96 rods long. What is it worth, at $66 an acre.

9. A field is 45 rods wide, and contains 36 acres. How long is it?

10. A pasture is 48 rods wide, and contains 15 acres How long is it, and what would be the cost of a fence around it, at 95 cts. a rod?

11. A meadow is 68 rods long, and its area is 23 acres 60 sq. rods. What would be the cost of the fence surrounding it, at 85 cts. a rod?

12. A lot is 66 ft. wide, and its area is 10890 sq. ft. A close board fence five feet high surrounds it. Find its value, at 1 ct. 5 mills a square foot.

13. How many sheets of paper 9 in. long and 6 in. wide can be cut from a roll 2 yds. wide and 50 yds. long?

14. A cellar is 33 ft. long and 21 ft. wide. Find the cost of cementing the floor, at $1.30 a square yard.

15. A lodge-room is 60 ft. long, 42 ft. wide, and 15 ft. high. It is to be plastered, at 25 cts. a square yard, and the floor covered with ingrain carpet, at 62 cts. 5 mills a yard. Find the entire cost.

### Applications of Square Measure.

16. How many granite blocks would be necessary to pave a street 1320 ft. long and 50 ft. wide, allowing six blocks to the square foot?

17. How many sods 18 in. long and 10 in. wide would be required for a lawn 60 ft. square?

18. How many tiles 15 in. square would cover the floor of an office 20 ft. long by 16 ft. 3 in. wide?

19. How many bricks 8 in. long by 4 in. wide would pave a walk 50 ft. long and 2 ft. 8 in wide?

20. How many panes of glass, each 32 in. long and 20 in. wide, would be required for 24 windows, each 5 ft. 4 in. long and 3 ft. 4 in wide?

21. A parlor is 27 ft. long by 18 ft. wide. Find the cost of covering the floor with rugs 4 ft. 6 in. long and 2 ft. 3 in wide, at $3.75 each.

22. How many boards 16 ft. long and 15 in. wide would be necessary to inclose the sides of a barn 60 ft. long, 40 ft. wide, and 20 ft. high?

23. A roll of paper 150 yds. long and 3 ft. 6 in. wide is to be cut into posters 1 ft. 9 in. by 1 ft. 3 in. Find their value, at $.005 apiece.

24. The floor of an art gallery 64 ft. long and 36 ft. wide is to be made of marble tiles 12 in. by 18 in., at $0.875 each. Find the cost of the floor.

25. A stable is 72 ft. in length, and the rafters on each side are 18 ft. long. What would be the cost of covering the roof with slates 9 in. by 16 in., at five cents apiece, allowing one half for overlapping?

26. An improvement company subdivided a quarter-section of land into building lots 4 rods wide by 10 rods long, after allowing one fourth of the entire tract for streets. If the lots were sold at $5 per front foot, what sum was realized?

## ARTICLE 70.

## Cubic Measure.

1. Reduce 100 cords 100 cu. ft. to cubic feet.

2. Reduce 2 cords 1 cu. ft. 348 cu. in. to cubic inches.

3. Reduce 10 cu. yds. 19 cu. ft. 608 cu. in. to cubic inches.

4. Reduce 75 cords 12 cu. ft. to cubic yards.

5. Reduce 5 cords 50 cu. ft. 500 cu. in. to cubic inches.

6. Reduce 1166400 cu. in. to cubic yards.

7. Reduce 10625 cu. ft. to cords.

8. Reduce 436455 cu. in. to cubic yards.

9. Reduce 151 cu. yds. 19 cu. ft. to cords.

10. Reduce 2764800 cu. in. to cords.

11. How many cubic yards of excavation in a cellar 33 ft. long, 21 ft. wide and 6 ft. deep?

**12.** A marble slab is 54 in. long, 32 in. wide, and 3 in. thick. What is its value, at $6.25 a cubic foot?

**13.** How many cords of wood in a pile 160 ft. long, 12 ft. wide, and 10 ft. high?

**14.** How many bars of soap, each 6 in. long, 3 in. wide, and 2 in. thick, can be packed in a box whose inside measurement is 18 in. by 15 in. and 10 in. deep?

**15.** How many headstones, each 4 ft. long, 2 ft. wide, and 4 in. thick, would be equal in volume to a block of marble 8 ft. long, 4 ft. wide, and 3 ft. thick?

**16.** A street 1620 ft. long, and 50 ft. wide, is to be graded to a depth of two feet. What will the excavation cost, at $0.125 a cubic yard.

**17.** A squared log is 24 ft. long, and 2 ft. square at the ends. How many boards 12 ft. long, 1 ft. wide, and 1 in. thick, can be sawn from it?

**18.** How many cubical blocks, whose edges are three inches in length, can be placed in a cubical box whose depth is 18 in.

**19.** A tank is 11 ft. long, 4 ft. wide, and 3 ft. 6 in. deep. How many gallons will it hold, allowing 231 cu. in. to the gallon?

**20.** A bin is 10 ft. long, 5 ft. wide, and 3 ft. 7 in. deep. How many bushels of wheat will it contain, allowing 2150 cu. in. to the bushel?

NOTE—*Employ Cancellation in the Solution of the following.*

**21.** A pile of wood is 64 ft. long, 8 ft. wide, and 9 ft. high. How many cords does it contain?

**22.** A cellar is to be 45 ft. long, 24 ft. wide, and 7 ft. deep. How many cubic yards of earth must be removed?

**23.** How many cubical toy-blocks, two inches in length, can be packed in a box 3 ft. long, 2 ft. wide, and 1 ft. high.

24. How many posts, 4 in. square and 6 ft. long, could be sawed from a log 2 ft. square at the ends, and 24 ft. long.

25. Find the cost of a pile of wood 88 ft. long, 8 ft. wide, and 10 ft. high, at $4.25 a cord.

26. What would it cost to dig a ditch 432 ft. long, 3 ft. deep, and 4 ft. wide, at 17 cts. 5 mills a cubic yard?

27. A granary, 43 ft. long, and 10 ft. wide, is filled with wheat to a depth of 5 ft. What is the value of the wheat, at 87 cts. 5 mills per bushel, allowing 2150 cu. in. to the bushel?

28. A rectangular block of marble, 6 ft. long, 4 ft. wide, and 3 ft. thick, was sawn into slabs 36 in. long, 24 in. wide, and 3 in. thick, which were sold at $7.50 apiece. What was received for them?

29. A reservoir is 22 ft. long, 14 ft. wide, and 6 ft. deep. How many gallons will it hold, allowing 231 cu. in. to a gallon?

30. How many planks, 10 ft. long, 10 in. wide, and 1 in. thick, could be sawn from a log 20 in. square and 20 ft. long?

31. How many dozen oyster-cans, each 6 in. long, 5 in. wide, and 2 in. deep, can be packed in a box 40 in. long, 24 in. wide, and 18 in. deep?

32. How many starch-boxes, each 28 in. long, 16 in. wide, and 8 in. high, could be placed in a car 35 ft. long, 8 ft. wide, and 7 ft. high (inside measurement)?

33. A kiln of brick was 80 ft. long, 30 ft. wide, and 10 ft. high. If each brick was 8 in. long, 4 in. wide, and 2 in. thick, what was the value of the kiln, at $10 per thousand.

34. A reservoir is 280 ft. long, 198 ft. wide, and 49 ft. deep. How long would it require a pipe discharging 288 gal. per minute to fill it, allowing 231 cu. in. to the gallon?

## Article 71.

### Time Measure.

1. Reduce 1 week 6 days 23 hours 59 minutes to minutes.

2. Reduce 5 days 15 hours 10 minutes 5 seconds to seconds.

3. Reduce 1 leap year to seconds.

4. How many minutes will there be in the year 1900?

5. How many seconds in February, March, and April, 1896?

6. Reduce 608401 seconds to weeks.

7. Reduce 1576800 minutes to common years.

8. Reduce 31535999 seconds to weeks.

9. Reduce 2108160 minutes to leap years.

10. Reduce 31556926 seconds to days.

11. Two cities are situated upon the same stream, 1000 miles apart. In what time can a steamer sail from one to the other, at the rate of eight miles per hour?

12. There were 52 Sundays in the year 1892. If a man worked 10 hours a day for every working-day in that year, and his wages were $0.175 per hour, how much did he earn?

13. A pedestrian traveled a certain distance in 24 hrs. 26 min. 40 sec., at the rate of two yards per second. What was the distance (1760 yards = one mile)?

14. A locomotive running from New York to San Francisco consumed 21 tons of coal, at the rate of 250 lb. per hour. In what time was the trip made?

15. A reservoir containing 10800000 gallons of water discharges 25 gal. per second. How long will it take to empty it?

16. A farmer mowed a meadow in 8 days of 12 hrs.

each. If he mowed 20 sq. rods per hour, how many acres were in the meadow?

17. A party of laborers dug a mill-race 1500 yds. long, 12 ft. wide, and 3 ft. deep, at the rate of one cubic yard in five minutes. If they worked 10 hrs. a day, how many days were they employed?

18. If a man can weave one inch of rag carpet in two minutes, in how many days of nine hours each can he weave the carpet for a room 18 ft. long and 15 ft. wide?

19. A flouring-mill ground a certain quantity of wheat in six days, running night and day, at the rate of one pint in five seconds. How many bushels were ground?

20. What time would be required to count from 1 to 1000000, at the rate of 25 consecutive numbers per minute for 10 hrs. per day?

## Article 73.

### Troy Weight.

1. Reduce 10 lb. 9 oz. 8 pwt. 7 gr. to grains.
2. Reduce 100 lb. 10 oz. to pennyweights.
3. Reduce 99 lb. 11 oz. 19 pwt. 23 gr. to grains.
4. Reduce 312 lb. 9 oz. 15 pwt. to pennyweights.
5. Reduce 173 lb. 7 oz. 6 pwt. 16 gr. to grains.
6. Reduce 570240 gr. to pounds.
7. Reduce 24441 pwt. to pounds.
8. Reduce 5759 gr. to ounces.
9. Reduce 507072 gr. to pounds.
10. Reduce 750750 gr. to pounds.

11. A silversmith converted 24 lbs. of silver into tablespoons, which he sold at $1.25 apiece. If each spoon weighed 15 pwt., how much was received for the lot?

12. 100 silver cups were offered as prizes at a state

fair. If their value was $500, and the silver cost five cents a pennyweight, what was the weight of each cup?

13. A gold-miner's gatherings averaged one grain a minute for 200 days of 12 hrs. each. How much gold did he gather?

14. The American trade dollar contains 420 gr. pure silver. If 1400 lb. of pure silver were coined into trade dollars, what would be their value?

15. $48000 was paid for a number of gold medals awarded at an International Exposition. If the gold was worth $240 a pound, and the medals weighed 10 pwt. each, how many were awarded?

16. A wholesale jeweler manufactured a quantity of gold into watchcases weighing 1 oz. each, which he sold at four cents a grain. If he received $1920 for the lot, how many cases were there?

17. The Communion-plate of a certain church cost $1440, at $0.96 a pwt. How much did it weigh?

18. A goldsmith bought three pounds of gold, at $20 an ounce, and made it into rings weighing 4 pwt. each, which he sold at five dollars apiece. Find his entire gain.

19. A government assayer estimated the value of a silver brick to be $171.45; at $0.045 a pennyweight, what was the weight of the brick?

20. A mining company's output of silver for a certain month was cast into bars, and sold to the U. S. Mint for $27900, at the rate of $0.775 per ounce. If each bar weighed five pounds, how many bars were in the lot?

## ARTICLE 73.

### Apothecaries' Weight.

1. Reduce 3 lb. 10 ℥ 4 ʒ 2 ℈ 15 gr. to grains.
2. Reduce 5 lb. 7 ʒ to scruples.
3. Reduce 8 lb. 8 ℥ 4 ʒ 1 ℈ to grains.
4. Reduce 150 ℥ to scruples.
5. Reduce 214 lb. 4 ℥ 7 gr. to grains.
6. Reduce 5759 gr. to ounces.
7. Reduce 28800 ℈ to pounds.
8. Reduce 644721 gr. to pounds.
9. Reduce 480000 gr. to ounces.
10. Reduce 575999 gr. to pounds.
11. A druggist sold 4 ℥ 3 ʒ 2 ℈ of morphine, at $0.05 a scruple. How much did he receive for it?
12. An apothecary bought calomel at $5.75 a pound, and sold it at $0.002 a grain. What was his profit per pound?
13. A quantity of medicine was compounded into five-grain pills, which were sold for $22.50, at $0.015 each. What was the weight of the medicine?
14. 5 lb. 6 ℥ 5 ʒ 1 ℈ of quinine was made into four-grain pills, which were put into boxes, each containing 20 pills, and sold at 25 cts. per box. How much was received for the entire quantity?
15. A retail druggist received an order for a number of three-grain antifebrile powders, for which he charged $28.80, at the rate of $0.015 each. What quantity of medicine was required?
16. During an epidemic of cholera, 384000 fifteen-grain powders were used in a certain district. What was their value, at $10 per pound?
17. A homeopathic dispensary manufactured 173 lb. 7 ℥ 2 ʒ 2 ℈ of drugs into pellets. If each pellet contained one tenth of a grain, how many were made?

18. A quantity of calomel was made into ten-grain powders, and sold for $25, at the rate of five cents a powder. What quantity of calomel was required?

19. A lot of medicine, weighing 11 ℥ 6 ʒ 2 ℈ was made into capsules, and sold for $28.40, at the rate of $0.025 apiece. What was the weight of each capsule?

20. An avoirdupois pound contains 7000 gr. If an apothecary, by mistake, should sell 10 lb. of drugs by avoirdupois weight, what would be his loss, at five cents a scruple?

## Article 73.

### Miscellaneous Tables.

1. 15 bls. of flour, costing $4.25 per barrel, were emptied into 28-pound sacks, which were sold at $.75 per sack. What was the entire gain?

2. A contractor bought a quantity of pork, and sold it all for $1500, at six cents a pound. How many barrels were there?

3. A paper-dealer sold 100 bundles of paper at $0.005 per sheet, thereby gaining $105. What was the cost per bundle?

4. 50 gross of buttons were sold for four cents a dozen, by which $6 was lost. What was the cost per dozen?

5. Beef was bought at $15 a barrel, and sold at seven cents a pound. If the total loss was $100, how many barrels were sold?

6. 18 lb. of silver was manufactured into society badges weighing five pennyweights each, which were sold at $64.80 per gross. What was received for the entire number?

7. Bought 1500 marbles, at five cents per score, and sold them at four cents a dozen. What was my gain?

8. Sixteen tons of iron was made into nails, which were sold at $4.75 per keg. How much was received for the lot?

9. A campaign committee mailed 120000 circulars just before a certain election. If they cost 75 cts. a ream, how much was paid for them?

10. A number of barrels of flour were emptied into sacks, each weighing 14 lb., and sold, at 40 cts. per sack, for $140. What was the number of barrels?

11. An army of 50000 men consumed one pound of pork apiece per day on a four-days' march. What was the value of the pork, at $12.50 per barrel?

12. 86400 shoestrings were packed into boxes, each containing five gross, and sold at $2.25 per box. How much was realized?

13. One edition of an octavo work of 640 pages comprised 7500 volumes. How many reams of paper were required?

14. 10 lb. of medicine were made into Seidlitz powders, each weighing 60 gr., and sold at 60 cts. per dozen powders. What was their value?

15. 25 lb. of steel was manufactured into pens. Allowing two ounces to the gross, what was the entire quantity worth, at six cents a dozen?

## ARTICLE 74.

### Promiscuous Examples.

1. Reduce 25 bu. 3 pks. to pints.
2. Reduce 94 gal. 2 qts. to gills.
3. Reduce 10 tons 10 lb. to ounces.
4. Reduce 999 yds. 2 ft. 11 in. to inches.
5. Reduce 9 sq. miles 490 acres to square rods.
6. Reduce 5 cords 3 cu. ft. 7 cu. in. to cubic inches.

7. Reduce 7 weeks 6 days 23 hrs. to seconds.
8. Reduce 33 lb. 4 oz. to grains.
9. Reduce 11 lb. 11 ℥ 1 ℈ 11 gr. to grains.
10. Reduce 21 reams 21 sheets to sheets.
11. Reduce 18625 pts. to bushels.
12. Reduce 3565 gills to gallons.
13. Reduce 150000 oz. to tons.
14. Reduce 63359 in. to yards.
15. Reduce 128304 sq. in. to square yards.
16. Reduce 483850 cu. in. to cubic yards.
17. Reduce 5529600 cu. in. to cords.
18. Reduce 694861 sec. to weeks.
19. Reduce 444444 gr. to pounds Troy.
20. Reduce 30941 gr. to pounds Apoth.
21. Reduce 60000 sheets of paper to reams.
22. Reduce 313600 oz. of flour to barrels.
23. Reduce 1000 bu. 1 pt. to pints.
24. Reduce 987 gal. 1 pt. to gills.
25. Reduce 20 tons 19 cwt. 99 lb. 15 oz. to ounces.
26. Reduce 100 miles 100 rods to rods.
27. Reduce 6 sq. miles 70 acres 25 sq. rods to square rods.
28. Reduce 4 cords 66 cu. ft. 1216 cu. in. to cubic inches.
29. Reduce 365 days 5 hrs. 48 min. 46 sec. to seconds.
30. Reduce 100 lb. 10 pwt. 1 gr. to grains.
31. Reduce 75 lb. 7 ℥ 5 gr. to grains.
32. Reduce 99 reams 19 quires 23 sheets to sheets.
33. Reduce 175 bls. 75 lb. of flour to ounces.
34. Reduce 1010001 pts. to bushels.
35. Reduce 987654 gills to hogsheads.
36. Reduce 5000000 oz. to tons.
37. Reduce 54030 in. to yards.
38. Reduce 10137600 sq. rods to square miles.

39. Reduce 2433023 cu. in. to cords.
40. Reduce 262974 min. to weeks.
41. Reduce 777777 gr. to pounds Troy.
42. Reduce 639360 gr. to pounds Apoth.
43. Reduce 440044 sheets to reams.
44. Reduce 1000000 oz. of flour to barrels.
45. Reduce 1616161 sq. rods to square miles.
46. Reduce 319 cords 73 cu. ft. to cubic yards.
47. Reduce 496 hhds. 2 gal. to gills.
48. Reduce 9 tons 9 cwt. 90 lb. 9 oz. to ounces.
49. Reduce 3240 score to gross.
50. Reduce 3168000 in. to miles.

*Find the cost of*

51. 10 bu. of plums, at 5 cts. a quart.
52. 10 gal. of wine, at 10 cts. a gill.
53. 3 tons of hay, at 5 mills a pound.
54. 25 yds. of lace, at 4 cts. an inch.
55. A lot 100 yds. square, at 1 ct. a square foot.
56. A cubic yard of granite, at 5 mills a cubic inch.
57. 30 days' house rent, at 2 mills a minute
58. 5 lb. of silver bullion, at 4 cts. a pwt.
59. 4 lb. of opium, at 3 cts. a scruple.
60. 50 bls. of flour, at 3 cts. a pound.
61. 100 reams of foolscap, at 5 mills a sheet.
62. 15 gross of lead pencils, at 25 cts. a dozen.
63. 75 bls. of beef, at $8 per hundred pounds.
64. A quarter-section of land, at $0.375 a square rod.
65. 10 lb. of refined gold, at 5 cts. a grain.
66. A wholesale jeweler made 2 lb. 8 oz. of gold into rings, weighing four pennyweights each, and sold them at $4.50 apiece. What did he receive for them?
67. How many dozen pint bottles would be required to hold 10 hhds. of wine?

68. How many cards 2 in. wide and 4 in. long could be cut from five square yards of cardboard?

69. If a man's income were one mill per second, what would it be for the month of February, 1892?

70. How many two-inch cubes can be placed in a box 3 ft. long, 2 ft. wide, and 1 ft. deep, inside measurements?

71. 1000 pounds of iron was made into wire weighing 2 ounces to the yard. What was the total length?

72. A druggist made 1 lb. 8 ℥ 6 ℥ 2 ℈ of medicines into four-grain pills, which he sold at two cents each. What did he receive for them?

73. A grocer exchanged 3 bu. 4 qts. of strawberries, at $0.075 a quart, for eggs at 15 cts. a dozen. How many dozen did he receive?

74. What will it cost to paper the walls of a room 21 ft. long, 15 ft. wide, and 10 ft. high, at 12 cts. 5 mills a square yard?

75. A barrel of flour was made into loaves, at the rate of seven ounces to the loaf. What was their value at five cents each?

76. How much silver would be required to make 25 dozen spoons, each weighing 12 pwts?

77. A cistern whose capacity is 1875 gal. is filled by a pipe discharging 3 gal. 1 pt. per minute. How long will it take to fill it?

78. How many tons of anthracite coal can be stored in a bin 16 ft. long, 8 ft. wide, and 5 ft. deep, allowing 32 cu. ft. to the ton?

79. A merchant bought 75 gal. of cider at 20 cts. a gallon, and sold it at $0.035 a pint. What was his profit?

80. A section of land was divided into farms 40 rods square. How many farms were there?

81. Find the value of a fence surrounding a quarter-section of land at 75 cts. a rod.

82. 150 bu. of peaches were packed in baskets, each containing 2 pks. 4 qts., and sold at $0.875 per basket. How much was received for them?

83. A block of granite is 8 ft. long, 4 ft. wide, and 4 ft. thick. How many tons will it weigh, at the rate of 250 lb. to the cubic foot?

84. A railroad train runs two rods in a second. In what time will it run 50 miles?

85. A field 40 rods long and 32 rods wide produced 75 bu. of potatoes to the acre. What was the value of the crop, at 62 cts. 5 mills per bushel?

86. How many bricks, each 8 in. long, 4 in. wide, and 2 in. thick, can be piled in a box car 32 ft. long, 7 ft. wide, and 2 ft. deep, inside measurement?

87. A log 24 ft. long, and 2 ft. square at the ends, was sawn into posts 4 in. square and 8 ft. long. What was their value, at 22 cts. 5 mills apiece?

88. If the velocity of sound be 1100 ft. per second, what time would elapse between seeing the flash and hearing the report of a cannon five miles distant?

89. 12 bu. of cherries cost $19.20. How much was that per pint?

90. If a man's income is two cents a minute, what will it be in the year 1896?

91. A block of marble 6 ft. long, 4 ft. wide, and 3 ft. thick, was sawn into tiles one foot square and one inch thick. How many square yards would they cover?

92. A rick of hay was sold at eight mills a pound, and $80 was received for it. How many tons did it weigh?

93. $24 was paid for five-grain pills at two cents each. What was the total weight?

94. If steel rails weigh 55 lb. per yard, how many tons would be required to lay a railroad track 60 miles in length?

95. If the driving-wheels of a locomotive are 16 ft. in circumference, how many revolutions would each make in a trip over the above road?

96. 390 sheets of cardboard, each two feet wide and three feet long, were cut into packs of 52 cards, each three inches wide and four inches long. How many dozen packs were made?

97. A vintner put 999 gallons of wine into bottles containing 1 pt. 2 gills each, which he packed into baskets, each holding two dozen bottles. What was the total value, at $12 per basket?

98. A woodcutter earned $90 in six weeks, at the rate of $1.25 for each cord. How much wood did he chop per day?

99. 50 bu. of peanuts cost $1.10 a bushel, and were retailed at five cents a quart. How much was gained?

100. If a cubic inch of gold weighs 10 oz., what will be the value of an ingot 5 in. long, 3 in. wide, and 2 in. thick, at four cents a grain?

101. One pound of gold was manufactured into watch-seals weighing five pennyweights apiece, which were sold for $264. What was the value of each?

102. What quantity of medicine will be required for the number of five-grain pills that will realize $12.36, when sold at $0.015 each?

103. One day's rations of bread for a regiment cost $112, at 10 cts. a loaf. If each loaf weighed 14 oz., how many barrels were required?

104. A carpenter agreed to work 10 hrs. a day, at the rate of four mills per minute. If his wages amounted to $72, how many days did he work?

105. A reservoir was filled in 12 hrs. by a pipe which discharged 1 pt. 1. gill per second. How many gallons did it hold?

106. A fruiterer bought cranberries at 56 cts. a peck, and sold them at five cents a pint, thereby gaining $14.40. How many bushels did he have?

107. A crop of pears was packed in baskets, each holding 1 pk. 4 qts., and sold at $0.625 per basket. The total value was $75. What was the number of baskets?

108. An express train ran a certain distance in 2 hrs. 56 min., at the rate of three rods per second. What was the distance?

109. A crop of corn from a field 64 rods long and 45 rods wide was sold for $360, at the rate of 50 cts. per bushel. How many bushels did each acre yield?

110. A carload of Florida oranges was sold for $1250, at the rate of 25 cts. a dozen. If there were 10 doz. in a box, how many boxes were there?

111. How much iron would be required to shoe 1000 cavalry horses, allowing eight ounces to each shoe?

112. A hound running 64 rods per minute is chasing a fox whose speed is 56 rods per minute. If the fox has one mile the start, in what time will the hound catch him?

113. A poulterer has 600 turkeys. If he feed each a pint of corn daily for 40 days, what would be the cost of the corn at 40 cts. a bushel?

114. A pound avoirdupois contains 7000 grs. How many pounds of iron will be equal in weight to 175 lb. of silver?

115. If the distance from Boston to San Francisco is 3000 miles, in what time could a carrier-pigeon make the flight at the rate of five rods per second?

116. Fifty planks, each 15 ft. long and 16 in. wide, were cut into palings 3 ft. long by 2 in. wide, and sold for $2.50 per hundred. What was their value?

117. The fore wheel of a carriage is 12 ft. in circum-

ference, and the hind wheel 15 ft. How many more revolutions will the former make than the latter in going a distance of 10 miles?

**118.** A farmer exchanged 35 bu. of wheat at $0.015 per pint for five tons of anthracite coal at $0.003 per pound, and the balance in money. How much money did he receive?

**119.** A box 1 ft. 4 in. wide, 2 ft. 6 in. long, and 1 ft. deep was packed with law-books, 10 in. long, 8 in. wide, and 2 in. thick. What was their value, at $2.75 each?

**120.** 150 gross of colored crayons, at three cents a score, were exchanged for 3900 steel pens, at eight cents a dozen, and 160 pencils. What was one pencil worth?

**121.** How many sheets of cardboard, each 2 ft. wide and 3 ft. long, would be required to make 1800 photograph cards, each 4 by 6 in.?

**122.** A cask of wine was bought for $1.60 per gallon, and sold at $0.275 a pint, thereby yielding a profit of $36. How many gallons were in the cask?

**123.** A quantity of gold was made into sleeve-buttons, weighing 2 pwt. 12 gr. each, and the entire lot was sold for $300, at $7.50 a pair. How much gold was in them?

**124.** A box of glass contains 100 sq. ft. How many boxes would be required to glaze a factory containing 40 windows, with two sash to the frame, and nine panes of glass, each 12 in. long and 10 in. wide, to the sash?

**125.** A company of 80 men consumed 14 oz. of flour apiece daily during the first six months of the year 1892. How many barrels were required?

# COMPOUND NUMBERS.

## ARTICLE 75.

### Addition of Compound Numbers.

1. Add 175 bu. 3 pks. 2 qts. 1 pt.; 167 bu. 2 pks. 5 qts.; 182 bu. 1 pk. 1 pt.; 159 bu. 7 qts. 1 pt.; 148 bu. 3 pks. 6 qts.; and 166 bu. 2 qts. 1 pt.

2. Add 7 gal. 1 qt. 1 pt. 2 gills; 6 gal. 2 qts. 3 gills; 4 gal. 1 qt. 1 pt.; 3 gal. 1 pt. 2 gills; 2 gal. 3 qts. 1 gill; 1 gal. 1 gill.

3. Add 1 ton 2 cwt. 53 lb. 13 oz.; 1 ton 97 lb. 10 oz.; 1 ton 3 cwt. 18 lb.; 1 ton 1 cwt. 15 oz.; 1 ton 76 lb. 8 oz.; 1 ton 4 cwt. 12 oz.; 1 ton 3 cwt. 27 lb. 6 oz.

4. Add 40 cu. yds. 13 cu. ft. 125 cu. in.; 51 cu. yds. 15 cu. ft. 810 cu. in; 62 cu. yds.; 17 cu. yds. 1001 cu. in.; 73 cu. yds. 19 cu. ft. 555 cu. in.; 84 cu. yds. 21 cu. ft. 729 cu. in.; 74 cu. yds. 13 cu. ft. 654 cu. in.; 95 cu. yds. 24 cu. ft. 1310 cu. in.

5. Add 14 acres 150 sq. rods 2 sq. yds. 7 sq. ft. 21 sq. in.; 16 acres 39 sq. rods 2 sq. ft. 56 sq. in.; 21 acres 101 sq. rods 1 sq. yd. 100 sq. in.; 25 acres 68 sq. rods 9 sq. yds. 3 sq. ft.; 30 acres 6 sq. yds. 5 sq. ft. 79 sq. in.; 44 acres 44 sq. rods 4 sq. yds. 4 sq. ft. 44 sq. in.; 47 acres 118 sq. rods 5 sq. yds. 3 sq. ft. 132 sq. in.

6. Add 9 cords 55 cu. ft. 105 cu. in.; 10 cords 65 cu. ft. 666 cu. in.; 11 cords 75 cu. ft. 579 cu. in.; 12 cords 85 cu. ft. 217 cu. in.; 13 cords 95 cu. ft. 325 cu. in.; 14 cords 105 cu. ft. 536 cu. in.; and 15 cords 119 cu. ft. 188 cu. in.

7. Add 1 week 1 day 1 hr. 1 min. 1 sec.; 2 weeks 2 days 20 hrs. 20 min. 20 sec.; 3 weeks 3 days 11 hrs. 55 min. 33 sec.; 4 weeks, 4 hrs. 44 sec.; 5 weeks 4 days 49

min.; 6 weeks 5 days 22 hrs. 59 sec.; 7 weeks 3 days 6 hrs. 33 min. 13 sec.

8. Add 1 lb. 2 oz. 3 pwt. 4 gr.; 1 lb. 11 oz. 11 pwt. 11 gr.; 1 lb. 1 oz. 20 gr.; 1 lb. 19 pwt. 23 gr.; 1 lb. 8 oz. 14 pwt.; 1 lb. 6 oz. 6 gr.; 1 lb. 5 oz. 10 pwt. 8 gr.

9. Add 3 lb. 2 ℥ 3 ʒ 1 ℈ 10 gr.; 4 lb. 3 ℥ 4 ʒ 2 ℈ 7 gr.; 5 lb. 4 ℥ 5 ʒ 6 gr.; 6 lb. 5 ℥ 6 ʒ 2 ℈ 8 gr.; 7 lb. 7 ʒ 1 ℈ 11 gr.; 8 lb. 6 ℥ 2 ℈ 15 gr.; 9 lb. 7 ℥ 2 ʒ 1 ℈; 10 lb. 5 ℥ 1 ʒ 3 gr.

10. Add 8 miles 300 rods 4 yds. 2 ft. 10 in.; 9 miles 305 rods 4 yds. 2 ft. 8 in.; 10 miles 316 rods 2 yds. 2 ft. 6 in.; 11 miles 237 rods 1 yd. 4 in.; 12 miles 5 yds. 2 ft. 2 in.; 13 miles 256 rods 1 ft. 5 in.; 14 miles 314 rods 4 yds. 2 ft.; and 17 miles 187 rods 2 yds. 2 ft. 7 in.

11. Eight loads of wheat measured as follows: 25 bu. 2 pks. 1 pt.; 24 bu. 1 pk. 2 qts.; 26 bu. 3 pks. 1 pt.; 23 bu. 3 qts. 1 pt.; 27 bu. 2 pks. 4 qts. 1 pt.; 22 bu. 1 pk. 3 qts.; 25 bu. 3 pks. 1 pt.; and 24 bu. 2 pks. 1 qt. 1 pt. What was the total quantity?

12. Seven barrels of oil were gauged as follows: 44 gal. 3 qts. 1 pt. 2 gills; 45 gal. 2 qts. 3 gills; 43 gal. 1 qt. 1 pt.; 46 gal. 1 pt. 1 gill; 43 gal. 1 qt. 2 gills; 44 gal. 2 qts. 1 pt.; 45 gal. 1 qt. 1 pt. 1 gill. What were the entire contents?

13. Seven loads of castings weighed respectively: 2 tons 7 cwt. 25 lb. 11 oz.; 3 tons 5 lb. 10 oz.; 1 ton 19 cwt. 99 lb. 15 oz.; 2 tons 5 cwt. 13 lb. 12 oz.; 1 ton 17 cwt. 75 lb. 14 oz.; 2 tons 4 cwt. 56 lb. 13 oz.; 2 tons 6 cwt. 21 lb. 5 oz. How much did all weigh?

14. The excavation for a cellar was made in eight days as follows; 41 cu. yds. 12 cu. ft. 515 cu. in.; 43 cu. yds. 11 cu. ft. 421 cu in.; 42 cu. yds. 21 cu. ft. 1029 cu. in.; 39 cu. yds. 20 cu. ft. 777 cu. in.; 40 cu. yds. 17 cu. ft. 913 cu. in.; 43 cu. yds. 13 cu. ft. 894 cu. in.; 42 cu. yds.

19 cu. ft. 1616 cu. in.; 39 cu. yds. 16 cu. ft. 747 cu. in How much was excavated?

15. Six farms were surveyed as follows: 100 acres 116 sq. rods 5 sq. yds. 8 sq. ft.; 110 acres 40 sq. rods 4 sq. yds. 6 sq. ft.; 111 acres 48 sq. rods 3 sq. yds.; 99 acres 125 sq. rods 7 sq. ft.; 113 acres 10 sq. yds. 5 sq. ft.; 104 acres 150 sq. rods 5 sq. yds. 1 sq. ft. How much land was included?

16. Eight wood-choppers cut the following quantities of wood respectively: 125 cords 69 cu. ft. 216 cu. in.; 121 cords 56 cu. ft. 324 cu. in.; 126 cords 41 cu. ft. 432 cu. in.; 124 cords 125 cu. ft. 648 cu. in.; 122 cords 108 cu. ft. 864 cu. in.; 128 cords 75 cu. ft. 1080 cu. in.; 123 cords 121 cu. ft. 1296 cu. in.; 126 cords 42 cu. ft. 324 cu. in. How much did all cut?

17. The time of a sailing vessel in seven voyages across the Atlantic was as follows: 51 days 9 hrs. 16 min. 44 sec. 50 days 15 hrs. 45 min. 32 sec.; 52 days 6 hrs. 19 min. 48 sec.; 49 days 25 min. 57 sec.; 52 days 4 hrs. 1 min.; 54 days 5 hrs. 15 sec.; 55 days 12 hrs. 59 min. 30 sec. In what time were the seven trips made?

18. A jeweler bought eight ingots of silver, weighing respectively: 2 lb. 1 oz. 10 pwt. 14 gr.; 2 lb. 5 oz. 7 pwt. 7 gr.; 2 lb. 4 oz. 8 pwt. 15 gr.; 2 lb. 3 oz. 11 pwt. 21 gr.; 2 lb. 5 oz. 12 gr.; 2 lb. 2 oz. 2 pwt.; 2 lb. 19 pwt. 20 gr.; 2 lb. 2 oz. 1 pwt. 10 gr. What was the entire weight?

19. A wholesale druggist's sales for one day were as follows: 12 lb. 8 ℥ 7 ʒ 1 ℈ 10 gr.; 13 lb. 7 ℥ 6 ʒ 2 ℈ 18 gr.; 16 lb. 9 ℥ 5 ʒ 13 gr.; 17 lb. 7 ℥ 4 ʒ 1 ℈; 19 lb. 11 ℥ 3 ʒ 2 ℈ 15 gr.; and 20 lb. 4 ʒ 4 gr. What was the amount of his sales?

20. A carrier-pigeon made the following record in seven days: 143 miles 34 rods 1 yd. 2 ft. 3 in.; 146 miles 100 rods 2 yds. 9 in.; 141 miles 75 rods 1 ft. 6 in.;

145 miles 108 rods 1 yd. 2 ft.; 140 miles 4 yds. 1 ft. 10 in.; 142 miles 111 rods 5 yds. 4 in.; 141 miles 209 rods 1 ft. 10 in. How far did it fly during the week?

### Article 76.

### Subtraction of Compound Numbers.

1. From 99 bu. 1 pk. take 50 bu. 1 pt.

2. What is the difference between 75 bu. 1 qt. and 63 bu. 3 pks. 1 pt.?

3. Subtract 37 gal. 1 gill from 63 gal.

4. 400 gal. 3 qts. 1 pt. — 300 gal. 2 qts. 3 gills = what?

5. From 15 tons 14 lb. take 10 tons 16 cwt. 21 lb. 15 oz.

6. Take 74 acres 131 sq. rods 10 sq. yds. 8 sq. ft. 120 sq. in. from 125 acres 97 sq. rods 26 sq. yds. 2 sq. ft. 16 sq. in.

7. Subtract 48 acres 141 sq. rods 25 sq. yds. 7 sq. ft. 121 sq. in. from 150 acres 80 sq. rods 29 sq. yds. 5 sq. ft. 77 sq. in.

8. What is the difference between 50 miles 50 rods 5 yds. 5 in. and 10 miles 100 rods 1 ft. 10 in.?

9. 1000 miles — 849 miles 149 rods 1 yd. 1 ft. 6 in. = what?

10. From 25 cu. yds. 25 cu. ft. 25 cu. in. take 19 cu. yds. 26 cu. ft. 1703 cu. in.

11. From 100 cu. yds. subtract 17 cu. ft. 729 cu. in.

12. Take 31 cords 100 cu. ft. 923 cu. in. from 75 cords 100 cu. ft. 467 cu. in.

13. 39 cords 64 cu. ft. 500 cu. in. less 28 cords 91 cu. ft. 1228 cu. in. = what?

14. Subtract 7 weeks 6 days 17 hrs. 16 min. 50 sec. from 10 weeks 5 days 18 hrs. 15 min. 25 sec.

15. 365 days 5 hrs. 48 min. 46 sec. — 164 days 9 hrs. 28 min. 26 sec. = what?

16. What is the difference between 75 lb. 11 oz. 15 pwt. 20 gr. and 88 lb. 10 oz. 16 pwt. 11 gr.?

17. From 45 lb. 1 pwt. take 43 lb. 5 oz. 19 pwt. 7 gr.

18. Take 9 lb. 10 oz. 11 pwt. 12 gr. from 12 lb. 11 11 oz. 10 pwt. 9 gr.

19. Subtract 1 ʒ 19 gr. from 1 lb.

20. 11 lb. 1 ʒ 1 gr. — 10 lb. 11 ʒ 2 ℈ 11 gr. = what?

21. A farmer having raised 555 bu. 2 pks. 1 pt. of grain, sold 250 bu. 3 pks. 5 qts. at one time, and 256 bu. 2 pks. 1 pt. at another. How much remained?

22. A vintner having 378 gal. of wine, disposed of it to three merchants. The first took 100 gal. 1 pt. The second, 127 gal. 3 gills. What did the third take?

23. Three loads of hay weighed 4 tons 2 cwt. 85 lb. The first weighed 1 ton 5 cwt. 90 lb. The second 1 ton 8 cwt. 99 lb. How much did the third weigh?

24. A pedestrian walked 71 miles 130 rods 5 yds. 1 ft. in two days. If he traveled 37 miles 275 rods 4 yds. 2 ft. the first day, how far did he go on the second?

25. A owns 85 acres 64 sq. rods 15 sq. yds. 4 sq. ft. of land. B owns 10 acres 128 sq. rods 5 sq. yds. 8 sq. ft. less. How much land have they together?

26. C, D, and E dug a cellar 21 ft. long, 18 ft. wide, and 6 ft. deep. C dug 27 cu. yds. 20 cu. ft. 788 cu. in.; D, 29 cu. yds. 7. cu. ft. 1643 cu. in. What did E dig?

27. A cut 11 cords 56 cu. ft. of wood; B cut 2 cords 91 cu. ft. less than A; and C cut 1 cord 100 cu. ft. less than B. How many cords were cut altogether?

28. An express train from New York to San Francisco made the trip in 1 week 1 day 15 hrs. 16 min. 44 sec., while a freight train occupied 3 weeks 4 days 10 hrs. 17 min. 32 sec. over the same road. How much time was gained by the express?

29. A druggist compounded 10 lb. 7 ℥ 6 ʒ 1 ℈ 15 gr. of drugs into medicine, of which he sold to one physician 4 lb. 9 ℥ 7 ʒ 2 ℈ 18 gr., and to another 4 lb. 8 ℥ 5 ʒ 16 gr. How much remained?

30. A jeweler bought 100 oz. of silver, of which he made 44 oz. 10 pwt. 16 gr. into spoons, which was 6 oz. 6 pwt. 12 gr. more than he made into forks. He made napkin-rings of the remainder. How much silver was put into them?

## Article 77.

### Time Between two Dates.

1. War was declared by the United States against Mexico May 13, 1846. The City of Mexico was captured by Gen. Scott September 14, 1847. How long did the war last?

2. How long was it from Washington's inauguration, April 30, 1789, to his death, December 14, 1799?

3. The Battle of Lexington was fought April 19, 1775. Cornwallis surrendered at Yorktown October 19, 1781. What was the length of the Revolutionary War?

4. America was discovered by Columbus October 12, 1492. What length of time had elapsed from that date to January 1, 1892?

5. The War of 1812 began June 19, 1812, and ended by the Treaty of Ghent, February 18, 1815. How long did it last?

6. Franklin was born January 17, 1706, and died April 17, 1790. What was his age?

7. How long was it from Hull's Surrender, August 16, 1812, to the Battle of New Orleans, January 8, 1815?

8. A man was born January 25, 1846. His youngest son was born August 7, 1883. What is the difference in their ages?

9. Napoleon Bonaparte was born August 15, 1769. The battle of Waterloo was fought June 18, 1815. How old was Napoleon at that time?

10. Magellan started on his voyage around the world August 10, 1519. His vessel returned to Spain September 6, 1522. How long had it been gone?

11. A girl was born July 22, 1848, and married August 20, 1867. What was her age at that time?

12. A boy was born May 4, 1887. His sister is 3 yrs. 9 mo. 24 days older, and his brother is 2 yrs. 8 mo. 23 days older than the sister. What are the dates of the birth of the sister and the brother?

## ARTICLE 78.

### Time in Days Between Two Dates.

1. What is the number of days from July 1, to the ninth of the following October?

2. How many days elapsed from January 25, 1892, to the twelfth of June following?

3. How many days from August 7, 1892, to January 4, 1893?

4. Find the number of days from October 12, 1891, to January 31, 1892.

5. How many days from the twenty-second of February to the fourth of July, 1900?

6. A note was given March 17, and paid on the twenty-fourth of June following. How many days did it run?

7. Columbus sailed from Palos, in Spain, on the third of August, 1492, and landed at San Salvador October 12 following. How many days did the voyage occupy?

8. A building was begun March 4, 1891, and com-

pleted August 26 of the same year. How many days was it in building?

9. The Centennial Exposition at Philadelphia opened on June 5, 1876, and closed November 10 following. How long did it continue?

10. The Proclamation of Emancipation was issued by President Lincoln September 22, 1862, and became effective January 1, 1863. How many days elapsed between these dates?

11. A traveler started from New York to Europe April 17, and arrived at home on the fifteenth of the following September. How many days was he absent?

12. A laborer was employed on May 22, and discharged on the first of January following. If his wages were $10 a week, how much did he earn?

13. A note was given February 9, 1892, and paid ninety days afterward. What was the date of payment?

### Article 79.

### Multiplication of Compound Numbers.

1. Multiply 4 bu. 3 pks. 2 qts. 1 pt. by 15.
2. Multiply 7 gal. 3 qts. 2 gills by 32.
3. Multiply 1 ton 10 cwt. 25 lb. 12 oz. by 20.
4. Multiply 6 rods 4 yds. 1 ft. 6 in. by 22.
5. Multiply 1 sq. yd. 8 sq. ft. 136 sq. in. by 15.
6. Multiply 4 cords 18 cu. ft. 144 cu. in. by 24.
7. Multiply 1 week 2 days 7 hrs. 42 min. 50 sec. by 39.
8. Multiply 27 lb. 9 oz. 6 pwt. 16 gr. by 36.
9. Multiply 7 lb. 7 $\frac{3}{7}$ 7 3 7 gr. by 50.
10. Multiply 21 cu. yds. 23 cu. ft. 1080 cu. in. by 80.
11. 64 acres of wheat averaged 21 bu. 1 pk. 7 qts. 1 pt. What was the entire crop?

12. A vintner sold 99 bls. of wine, each containing 31 gal. 3 qts. 1 pt. 3 gills. What was the entire quantity sold?

13. A farmer's crop of hay was hauled to market in 32 loads, averaging 1 ton 8 cwt. 12 lb. 8 oz. to the load. How many tons did he raise?

14. Two stations are 76 miles 45 rods 5 yds. 2 ft. 6 in. apart, and an engine is required to make two trips between them daily for 66 days. How many miles will it have run at the end of the time?

15. Seventy-five laborers employed to chop wood, averaged 1 cord 32 cu. ft. 432 cu. in. apiece daily for four days. How much was cut altogether?

16. If it requires 38 men 1 week 2 days 12 hrs. 48 min. 45 sec. to do a certain work, in what time could it be done by one man?

17. A miner's gatherings averaged 1 oz. 6 pwt. 16 gr. a day for 45 days. How much gold did he gather?

18. 64 packages of drugs averaged 2 lb. 8 ℥ 6 ʒ 1 ℈ 10 gr. each. What was the total weight?

19. What would be the solid contents of 25 blocks of marble, each containing 5 cu. yds. 10 cu. ft. 720 cu. in.?

20. A tract of land was subdivided into 75 lots, each containing 2 acres 21 sq. rods 10 sq. yds. 108 sq. in. What was the area of the tract?

## Article 80.

### Division of Compound Numbers.

1. Divide 104 bu. 2 qts. by 12.
2. Divide 99 gal. 2 qts. 1 pt. 2 gills by 10.
3. Divide 78 tons 15 cwt. 79 lb. 11 oz. by 15.
4. Divide 318 yds. 2 ft. 8 in. by 20.
5. Divide 1210 sq. yds. by 40.

6. Divide 52 weeks 8 hours 4 min. 48 sec. by 24.

7. Divide 269 cords 69 cu. ft. 772 cu. in. by 50.

8. Divide 1000 lb. (Troy) by 64.

9. Divide 1000 lb. (Apoth.) by 72.

10. Divide 1150 cu. yds. 12 cu. ft. 864 cu. in. by 45.

11. Eleven loads of corn measured 554 bu. 1 pk. 1 qt. 1 pt. What was the average quantity per load.

12. Thirty-two barrels of wine contained 1010 gal. What were the average contents of each barrel?

13. Forty-two pieces of cloth, of equal length, contained 665 yds. What was the length of each piece?

14. A house of 16 rooms required 490 sq. yds. 96 sq. in. of carpet. What was the average number of yds. to each room?

15. Forty-eight loads of wood measured 50 cords 33 cu. ft. 1344 cu. in. What was the average quantity per load?

16. A steamer made 25 trips between Cincinnati and Wheeling in 99 days. What was the average time of each trip?

17. A mining company melted 588 lb. 6 oz. 10 pwt. of silver into 125 bars of equal weight. What was the weight of each bar?

18. Sixty-four loads of castings weighed 100 tons. What was the average weight of each load?

19. 114 cubic yards of earth were removed from a cellar in 96 loads. What were the solid contents of each load?

20. An improvement company bought a tract of land containing 35 acres 100 sq. rods, which they laid out into 33 lots of equal size. What was the area of each?

21. Divide 63 weeks 6 days 6 hrs. 20 min. 5 sec. by 49.

# LONGITUDE AND TIME.

ARTICLES 81 AND 82.

*Find the differences in time corresponding with the following differences in longitude:*

1. 50°.
2. 23° 30′.
3. 37° 37′.
4. 45° 1′.
5. 77° 10′ 15″.
6. 90° 59′ 45″.
7. 100° 30′.
8. 69° 9′ 30″.
9. 118° 5′ 15″.
10. 179° 59′ 45″.

*Find the differences in longitude corresponding with the following differences in time:*

11. 1 hr. 24 min.
12. 2 hrs. 10 min.
13. 3 hrs. 31 min. 40 sec.
14. 4 hrs. 3 min. 25 sec.
15. 5 hrs. 21 min. 18 sec.
16. 7 hrs. 13 min. 39 sec.
17. 8 hrs. 41 min. 53 sec.
18. 9 hrs. 19 min. 12 sec.
19. 11 hrs. 12 min. 14 sec.
20. 55 min. 55 sec.

21. A vessel sailed west 44°. How much too fast was a passenger's watch?

22. A gentleman left San Francisco and traveled 36° 45′ east, arriving at 12 m. What was the time by his watch, which still showed San Francisco time?

23. Two steamers left the Sandwich Islands at the same time, one sailing 20° 25′ east, the other 22° 32′ west. What was the difference in their time?

24. Two travelers started from New York to St. Louis at the same time. When the first arrived, the other was 3° 50′ behind him. How much was the latter's watch ahead of St. Louis time, if he had set it correctly?

25. Two places in east longitude are 33° 16′ 15″ apart. What is their difference in time?

26. One city is in longitude 12° 17′ 30″ east, and another is in longitude 78° 4′ 45″ west. When it is eleven o'clock a. m. at the latter place, what is the time at the former?

27. When it is 8 hrs. 15 min. a. m. at a certain place what is the time at a place 17° 40′ west of it?

28. When it is twenty minutes past one p. m. at a city in 84° 30′ west longitude, what is the time at a place in 13° 45″ east longitude?

29. When it is five o'clock a. m. on the prime meridian, what is the time on the 180th meridian?

30. What is the difference in time between two clocks. one in longitude 175° 45′ east, the other in longitude 177° 30′ west?

---

# FACTORING.

ARTICLE 87.

*Find the Prime Factors*

| | | | | | |
|---|---|---|---|---|---|
| 1. | Of 56. | 8. | Of 546. | 15. | Of 1955. |
| 2. | Of 64. | 9. | Of 570. | 16. | Of 2387. |
| 3. | Of 84. | 10. | Of 770. | 17. | Of 2431. |
| 4. | Of 100. | 11. | Of 864. | 18. | Of 3059. |
| 5. | Of 144. | 12. | Of 1001. | 19. | Of 3306. |
| 6. | Of 225. | 13. | Of 1309. | 20. | Of 3570. |
| 7. | Of 420. | 14. | Of 1729. | 21. | Of 4017. |

## Article 88.

*What Prime Factors are Common to*

1. 75 and 105?
2. 96 and 120?
3. 126 and 168?
4. 216 and 297?
5. 315 and 525?
6. 308 and 462?
7. 345 and 483?
8. 399 and 532?
9. 468 and 585?
10. 495 and 825?
11. 819 and 1365?
12. 54, 72, and 90?
13. 84, 126, and 210?
14. 112, 140, and 196?
15. 132, 176, and 198?
16. 140, 350, and 490?
17. 132, 330, 462, and 594?
18. 273, 351, 429, and 507?
19. 322, 483, 805, and 1127?
20. 204, 340, 476, and 612?
21. 342, 570, 798, and 1026?
22. 546, 819, 1365, and 1911?

## Article 89.

### Greatest Common Divisor.

*Find the Greatest Common Divisor*

1. Of 76 and 133.
2. Of 120 and 216.
3. Of 248 and 465.
4. Of 351 and 567.
5. Of 551 and 1073.
6. Of 612 and 900.
7. Of 702 and 1209.
8. Of 1075 and 1591.
9. Of 1431 and 2809.
10. Of 1472 and 1792.
11. Of 1848 and 2926.
12. Of 1892 and 3096.
13. Of 2405 and 3330.
14. Of 2211 and 3417.
15. Of 5994 and 9657.
16. Of 6783 and 11172.
17. Of 6409 and 14121.
18. Of 7344 and 11664.
19. Of 11583 and 17017.
20. Of 6660 and 10545.
21. Of 57, 95, and 133.
22. Of 96, 144, and 216.
23. Of 111, 296, and 407.
24. Of 224, 392, and 504.
25. Of 459, 765, and 1173.
26. Of 924, 1210, and 1683.
27. Of 1365, 2340, and 3549.
28. Of 1287, 2079, 4488, and 6384.
29. Of 2898, 3588, 3795, and 3910.
30. Of 7020, 8316, 9126, and 10773.

31. What is the capacity of the largest vessel that will exactly measure 2232, 2604, or 2945 gal. of petroleum?

32. A railroad company built three side tracks, 6699, 8671, and 9367 ft. in length. What is the greatest length of rail that could be used in their construction?

33. A grain-dealer wishes to construct a number of bins of equal capacity, which will exactly contain 2079 bu. of wheat, 2673 bu. of oats, and 3465 bu. of barley. How many bins must he have, and how many bushels will each hold?

34. A has 648 eggs, B 864, C 1008. If the largest boxes possible are made in which each can exactly pack his eggs, how many dozen will each box contain?

35. A company of speculators bought three tracts of land containing respectively 1029, 1176, and 1372 acres; which they divided into farms of the largest possible size to contain an equal number of acres. If the farms were sold at $1000 each, how much was realized?

## ARTICLE 90.

### Least Common Multiple.

*Find the Least Common Multiple*

1. Of 12, 28, 42.
2. Of 18, 30, 45.
3. Of 24, 30, 40.
4. Of 14, 18, 21.
5. Of 20, 22, 55.
6. Of 10, 45, 54.
7. Of 24, 39, 104.
8. Of 96, 120, 160.
9. Of 6, 10, 15, 25.

10. Of 30, 42, 70, 105.
11. Of 18, 50, 75, 90.
12. Of 30, 34, 51, 85.
13. Of 15, 20, 24, 25.
14. Of 12, 15, 18, 20.
15. Of 21, 28, 35, 60.
16. Of 24, 30, 36, 40, 45.
17. Of 20, 28, 30, 35, 42.
18. Of 20, 27, 30, 36, 45.
19. Of 14, 21, 26, 39, 91.
20. Of 20, 30, 33, 44, 55.
21. Of 40, 45, 48, 60, 72.
22. Of 14, 34, 35, 85, 119.
23. Of 38, 70, 95, 133.
24. Of 10, 35, 46, 115.
25. Of 21, 35, 51, 85, 119.
26. Of 33, 39, 77, 91, 143.
27. Of 34, 38, 85, 95, 323.
28. Of 51, 69, 85, 115, 391.
29. Of 87, 203, 231, 319.
30. Of 715 and 1001.
31. Of 889 and 1651.
32. Of 291, 485, and 679.

33. The driving wheels of three locomotives are respectively 14, 15, and 18 ft. in circumference. What is the shortest distance in which all of the wheels will make an exact number of revolutions?

34. What is the least quantity of starch that can be packed in 150-pound barrels, 40-pound boxes, or 24-pound packages?

35. A trader has exactly enough money to buy horses at $75, mules at $50, cows at $30, or Suffolk hogs at $12 each. How much money has he?

36. A can walk around a race-track in 12 min., B in

15, C in 18, and D in 20 min. If they start from the same place at the same time, and walk in the same direction, in what time will all first arrive at the starting place?

37. A coal-dealer has five bins whose capacities are respectively 102, 114, 255, 285, and 323 bu. What is the smallest number of bushels that could be measured exactly in each?

## Article 91.

### Cancellation.

1. Multiply 28 by 33, and divide the product by 7 times 11.

2. Divide 32 times 51 times 63 by 9 times 16 times 17.

3. How often is $19 \times 18 \times 15$ contained in $81 \times 95 \times 44$?

4. $27 \times 35 \times 48 \times 58$ is how many times $29 \times 56 \times 18 \times 30$?

5. Divide the product of $24 \times 36 \times 69 \times 75$ by the product of $23 \times 50 \times 72 \times 54$.

6. A grocer exchanged 20 doz. jars at 10 cts. apiece for berries at five cents a quart. How many bushels did he receive?

7. A trader exchanged 120 hhds. of tobacco, each weighing 174 lb., at 24 cts. a pound, for 116 bales of cotton, of 160 lb. each. What was the cotton worth per pound?

8. 96 carloads of anthracite coal, of 210 bu. each, worth 18 cts. a bushel, were given in exchange for 168 bls. of sugar, at nine cents a pound. What did the sugar weigh per barrel?

9. How many sods 20 in. long and 16 in. wide can be cut from a lawn 75 ft. long and 64 ft. wide?

10. A pile of wood is 112 ft. long, 12 ft. wide, and 10 ft. high. Find its value, at $4.50 a cord.

11. What would be the cost of carpeting a parlor 24 ft. long and 15 ft. wide, with ingrain carpet, at 65 cts. a square yard?

12. Ten sheets of cardboard, each 3 ft. wide and 4 ft. long, were cut into tickets 2 in. wide and 3 in. long, which were sold at 50 cts. per gross. How much was paid for them?

13. Find the cost of excavating a cellar 25 ft. long, 18 ft. wide, and 6 ft. deep, at 22 cts. 5 mills a cubic yard.

14. If 15 men can do a certain work in 32 days by working 9 hrs. a day, how many men could do the same work in 12 days by working 10 hrs. a day?

15. If 84 men can earn a certain sum of money in 18 weeks, working five days to the week, and 10 hrs. a day, how many hours a day should 105 men work for 15 weeks of six days each to earn the same sum?

16. How many days of nine hours each must 28 men work to earn $1209.60, at 20 cts. apiece per hour?

17. 450 bls. of flour of 196 lb. each, at 3 cts. a lb., were given in exchange for 147 bls. of pork, each weighing 200 lb. What was the value of the pork per pound?

18. A log 2 ft. square at the ends, and 18 ft. long was sawed into palings 36 in. long, 3 in. wide, and 1 in. thick. What was their value, at $1.75 per hundred?

19. How many thousand bricks 8 in. long, 4 in. wide, and 2 in. thick, would be required for a wall 400 ft. long, 5 ft. high, and 1 ft. thick, no allowance being made for mortar?

20. If it require 3072 tiles, each nine inches square, to pave a certain area, how many tiles 16 in. long by 12 in. wide would be required to pave an area twice as large?

21. 40 reams of paper, of 480 sheets to the ream, each sheet 3 ft. long and 2 ft. wide, was made into books of 320 pages, each page being 8 in. long and 6 in. wide How many dozen books were there in the entire edition?

---

# FRACTIONS.

ARTICLE 103.

## Reduction of Integers to Fractions of Given Denominators.

*Reduce:*

1. 13 to thirteenths.
2. 11 to seventeenths.
3. 25 to thirty-fifths.
4. 19 to twentieths.
5. 33 to forty-fourths.
6. 29 to thirty-sevenths.
7. 47 to forty-ninths.
8. 56 to nineteenths.
9. 64 to twenty-fifths.
10. 75 to fifty-sixths.
11. 125 to fifteenths.
12. 96 to fiftieths.
13. 45 to forty-eighths.
14. 69 to thirty-sixths.
15. 55 to twenty-eighths.
16. 39 to twenty-fourths.
17. 27 to sixty-fourths.
18. 88 to seventy-fifths
19. 99 to ninety-ninths.
20. 101 to hundredths.

## Article 104.—Case II.

*Reduce the following to Improper Fractions:*

1. $25\frac{1}{11}$
2. $31\frac{7}{15}$
3. $49\frac{9}{25}$
4. $57\frac{27}{37}$
5. $65\frac{44}{45}$
6. $78\frac{43}{59}$
7. $83\frac{25}{66}$
8. $99\frac{99}{99}$
9. $100\frac{99}{100}$
10. $111\frac{11}{111}$
11. $125\frac{53}{101}$
12. $247\frac{119}{125}$
13. $333\frac{33}{333}$
14. $42\frac{157}{401}$
15. $58\frac{83}{468}$
16. $67\frac{117}{509}$
17. $75\frac{172}{625}$
18. $86\frac{754}{777}$
19. $94\frac{693}{859}$
20. $99\frac{999}{1000}$
21. $101\frac{10}{1001}$
22. $111\frac{11}{999}$
23. $289\frac{288}{289}$
24. $375\frac{161}{444}$
25. $444\frac{161}{375}$
26. $456\frac{143}{144}$
27. $413\frac{14}{555}$
28. $39\frac{1091}{1331}$
29. $80\frac{1022}{1515}$
30. $75\frac{1875}{2001}$

## Article 105.—Case III.

*Reduce the following to Integers or Mixed Numbers:*

1. $\frac{166}{13}$
2. $\frac{562}{19}$
3. $\frac{871}{23}$
4. $\frac{1623}{37}$
5. $\frac{1911}{39}$
6. $\frac{2485}{44}$
7. $\frac{4028}{59}$
8. $\frac{5115}{68}$
9. $\frac{6332}{75}$
10. $\frac{6776}{77}$
11. $\frac{7829}{81}$
12. $\frac{10000}{99}$
13. $\frac{11111}{100}$
14. $\frac{16242}{125}$
15. $\frac{18769}{137}$
16. $\frac{21691}{144}$
17. $\frac{22566}{175}$
18. $\frac{10000}{201}$
19. $\frac{12884}{225}$
20. $\frac{18207}{289}$
21. $\frac{21905}{303}$
22. $\frac{32999}{375}$
23. $\frac{40000}{407}$
24. $\frac{49500}{449}$
25. $\frac{64625}{517}$
26. $\frac{89777}{644}$
27. $\frac{99999}{712}$
28. $\frac{134789}{864}$
29. $\frac{148048}{925}$
30. $\frac{175175}{1001}$

## Article 106.—Case IV.

1. Reduce $\frac{6}{7}$ to thirty-fifths.
2. Reduce $\frac{7}{13}$ to fifty-seconds.
3. Reduce $\frac{18}{23}$ to sixty-ninths.
4. Reduce $\frac{32}{33}$ to ninety-ninths.
5. Reduce $\frac{16}{25}$ to hundredths.

6. Reduce $\frac{11}{15}$ to a fraction whose denominator is 135.

7. Reduce $\frac{17}{36}$ to a fraction whose denominator is 144.

8. Reduce $\frac{19}{45}$ to a fraction whose denominator is 225.

9. Reduce $\frac{23}{48}$ to a fraction whose denominator is 288.

10. Reduce $\frac{13}{57}$ to a fraction whose denominator is 456.

11. Reduce $\frac{15}{64}$ to a fraction whose denominator is 704.

12. Reduce $\frac{37}{72}$ to a fraction whose denominator is 936.

13. Reduce $\frac{56}{87}$ to a fraction whose denominator is 1305.

14. Reduce $\frac{11}{91}$ to a fraction whose denominator is 1547.

15. Reduce $\frac{89}{99}$ to a fraction whose denominator is 1881.

16. Reduce $\frac{101}{108}$ to a fraction whose denominator is 2163.

17. Reduce $\frac{37}{112}$ to a fraction whose denominator is 2800.

18. Reduce $\frac{66}{119}$ to a fraction whose denominator is 3927.

19. Reduce $\frac{91}{125}$ to a fraction whose denominator is 4000.

20. Reduce $\frac{125}{144}$ to a fraction whose denominator is 1728.

21. Reduce $\frac{47}{150}$ to a fraction whose denominator is 1950.

22. Reduce $\frac{95}{216}$ to a fraction whose denominator is 5400.

23. Reduce $\frac{43}{217}$ to a fraction whose denominator is 6293.

24. Reduce $\frac{145}{256}$ to a fraction whose denominator is 8448.

25. Reduce $\frac{443}{444}$ to a fraction whose denominator is 9768.

## Article 107.—Case V.

*Reduce the following to their lowest terms:*

1. $\frac{96}{156}$
2. $\frac{152}{399}$
3. $\frac{240}{648}$
4. $\frac{465}{744}$
5. $\frac{544}{1071}$
6. $\frac{702}{1701}$
7. $\frac{924}{1260}$
8. $\frac{962}{1665}$
9. $\frac{1075}{1591}$
10. $\frac{1365}{2002}$
11. $\frac{1102}{3219}$
12. $\frac{1148}{2255}$
13. $\frac{1652}{1947}$
14. $\frac{1206}{2345}$
15. $\frac{1554}{2997}$
16. $\frac{2784}{3045}$
17. $\frac{2340}{3549}$
18. $\frac{2295}{3519}$
19. $\frac{3417}{4422}$
20. $\frac{2431}{3910}$
21. $\frac{3059}{3306}$
22. $\frac{6279}{8855}$
23. $\frac{8427}{10017}$
24. $\frac{10557}{12903}$
25. $\frac{12103}{13167}$
26. $\frac{11583}{17017}$
27. $\frac{17901}{26676}$
28. $\frac{30015}{36366}$
29. $\frac{63819}{92183}$
30. $\frac{3861}{5168}$

## Article 108.—Case VI.

*Reduce the following to Least Common Denominators:*

1. $\frac{2}{3}, \frac{5}{8}, \frac{7}{12}$
2. $\frac{8}{9}, \frac{11}{12}, \frac{17}{18}$
3. $\frac{2}{5}, \frac{3}{8}, \frac{9}{10}$
4. $\frac{7}{10}, \frac{7}{12}, \frac{7}{15}, \frac{7}{20}$
5. $\frac{5}{12}, \frac{7}{18}, \frac{11}{24}, \frac{17}{36}$
6. $\frac{4}{7}, \frac{7}{12}, \frac{9}{14}, \frac{16}{21}$
7. $\frac{8}{15}, \frac{13}{24}, \frac{17}{30}, \frac{23}{40}$
8. $\frac{4}{7}, \frac{8}{15}, \frac{11}{21}, \frac{18}{35}$
9. $\frac{5}{14}, \frac{7}{18}, \frac{8}{21}, \frac{17}{42}$
10. $\frac{11}{16}, \frac{13}{24}, \frac{19}{36}, \frac{25}{48}$
11. $\frac{1}{2}, \frac{3}{4}, \frac{4}{5}, \frac{6}{7}$
12. $\frac{4}{15}, \frac{16}{25}, \frac{17}{30}, \frac{23}{50}, \frac{37}{75}$
13. $\frac{7}{15}, \frac{7}{18}, \frac{7}{20}, \frac{7}{36}, \frac{7}{45}$
14. $\frac{3}{10}, \frac{5}{14}, \frac{4}{15}, \frac{8}{21}, \frac{13}{35}$
15. $\frac{5}{6}, \frac{3}{10}, \frac{4}{11}, \frac{8}{15}, \frac{27}{55}$
16. $\frac{5}{14}, \frac{9}{26}, \frac{13}{28}, \frac{25}{52}, \frac{44}{91}$
17. $\frac{7}{26}, \frac{11}{30}, \frac{14}{39}, \frac{19}{65}, \frac{49}{78}$
18. $\frac{13}{18}, \frac{16}{25}, \frac{19}{30}, \frac{28}{45}, \frac{64}{75}$
19. $\frac{11}{14}, \frac{13}{21}, \frac{15}{22}, \frac{23}{42}, \frac{41}{77}$
20. $\frac{7}{15}, \frac{8}{21}, \frac{9}{35}, \frac{11}{45}, \frac{17}{63}$
21. $\frac{5}{6}, \frac{3}{10}, \frac{2}{15}, \frac{7}{34}, \frac{12}{85}$
22. $\frac{11}{18}, \frac{7}{20}, \frac{13}{27}, \frac{17}{30}, \frac{19}{45}$

23. $\frac{3}{14}$, $\frac{4}{15}$, $\frac{5}{18}$, $\frac{10}{21}$, $\frac{12}{35}$

24. $\frac{8}{21}$, $\frac{11}{26}$, $\frac{16}{39}$, $\frac{19}{42}$, $\frac{37}{91}$

25. $\frac{5}{12}$, $\frac{7}{18}$, $\frac{13}{57}$, $\frac{29}{76}$, $\frac{53}{114}$

26. $\frac{13}{21}$, $\frac{19}{34}$, $\frac{23}{42}$, $\frac{28}{51}$, $\frac{66}{119}$

27. $\frac{7}{12}$, $\frac{8}{15}$, $\frac{11}{20}$, $\frac{20}{39}$, $\frac{33}{65}$

28. $\frac{13}{15}$, $\frac{16}{21}$, $\frac{19}{24}$, $\frac{27}{40}$, $\frac{41}{56}$

29. $\frac{5}{6}$, $\frac{7}{22}$, $\frac{9}{26}$, $\frac{14}{39}$, $\frac{75}{143}$

30. $\frac{1}{6}$, $\frac{9}{14}$, $\frac{13}{21}$, $\frac{41}{69}$, $\frac{87}{161}$

31. $\frac{25}{63}$, $\frac{48}{91}$, $\frac{64}{117}$

32. $\frac{17}{56}$, $\frac{47}{119}$, $\frac{79}{136}$

33. $\frac{19}{36}$, $\frac{57}{92}$, $\frac{101}{207}$

34. $\frac{12}{35}$, $\frac{24}{145}$, $\frac{36}{203}$

35. $\frac{49}{99}$, $\frac{58}{117}$, $\frac{71}{143}$

36. $\frac{13}{42}$, $\frac{16}{93}$, $\frac{48}{217}$

37. $\frac{25}{63}$, $\frac{75}{259}$, $\frac{125}{333}$

38. $\frac{127}{219}$, $\frac{157}{292}$, $\frac{187}{365}$

39. $\frac{99}{301}$, $\frac{173}{516}$

40. $\frac{253}{377}$, $\frac{331}{493}$

NOTE.—*Find the G. C. D. of the denominators of the last three problems. Then the product of the G. C. D., and the quotients will be the L. C. M.*

## Greatest Common Divisor of Fractions. (See Note.)

*Find the G. C. D. of*

1. $\frac{5}{12}$, $\frac{15}{16}$, $\frac{25}{48}$

2. $\frac{4}{5}$, $\frac{8}{9}$, $\frac{8}{15}$, $\frac{16}{27}$, $\frac{28}{45}$

3. $1\frac{3}{8}$, $2\frac{4}{9}$, $4\frac{7}{12}$, $6\frac{13}{18}$, $7\frac{19}{24}$

4. $5\frac{1}{3}$, $6\frac{2}{5}$, $7\frac{1}{9}$, $8\frac{8}{15}$, $9\frac{11}{45}$

5. $\frac{7}{10}$, $\frac{11}{12}$, $\frac{8}{15}$, $\frac{17}{20}$, $\frac{19}{30}$

6. $3\frac{3}{4}$, $5\frac{5}{8}$, $6\frac{9}{16}$, $7\frac{1}{32}$, $8\frac{13}{64}$

7. $12\frac{1}{2}$, $16\frac{2}{3}$, $18\frac{3}{4}$, $11\frac{1}{9}$, $10\frac{5}{12}$, $9\frac{13}{18}$

8. $2\frac{24}{25}$, $23\frac{13}{30}$, $5\frac{9}{50}$, $5\frac{32}{75}$, $4\frac{29}{150}$

9. $14\frac{4}{9}$, $19\frac{14}{15}$, $13\frac{13}{27}$, $17\frac{2}{45}$, $5\frac{1}{135}$

10. $18\frac{3}{4}$, $15\frac{5}{8}$, $14\frac{7}{12}$, $17\frac{3}{16}$, $19\frac{19}{24}$

11. $1\frac{3}{14}$, $1\frac{23}{28}$, $2\frac{1}{42}$, $3\frac{19}{56}$, $4\frac{55}{84}$

12. $9\frac{13}{18}$, $36\frac{11}{24}$, $34\frac{1}{36}$, $40\frac{5}{48}$, $31\frac{43}{72}$

NOTE.—*Reduce mixed numbers to improper fractions. Find the G. C. D. of the numerators for the numerator of the required fraction, and the L. C. M. of the denominators for its denominator.*

## Least Common Multiple of Fractions. (See Note.)

*Find the L. C. M. of*

1. $\frac{2}{3}$, $\frac{3}{5}$, $\frac{4}{9}$, $\frac{6}{11}$
2. $\frac{2}{9}$, $\frac{5}{12}$, $\frac{4}{15}$, $\frac{8}{21}$, $\frac{10}{27}$,
3. $3\frac{1}{3}$, $1\frac{7}{8}$, $2\frac{6}{7}$, $2\frac{4}{13}$, $3\frac{9}{17}$
4. $2\frac{3}{5}$, $3\frac{9}{10}$, $5\frac{17}{20}$, $4\frac{4}{25}$
5. $\frac{8}{15}$, $\frac{16}{45}$, $\frac{64}{75}$, $1\frac{23}{105}$, $1\frac{121}{135}$
6. $2\frac{2}{3}$, $2\frac{1}{4}$, $2\frac{2}{5}$, $2\frac{4}{7}$, $2\frac{2}{11}$, $2\frac{10}{13}$
7. $2\frac{1}{4}$, $3\frac{3}{8}$, $5\frac{1}{16}$, $4\frac{23}{28}$, $12\frac{21}{32}$
8. $12\frac{1}{2}$, $16\frac{2}{3}$, $18\frac{3}{4}$, $14\frac{2}{7}$, $13\frac{7}{11}$, $23\frac{1}{13}$
9. $\frac{7}{18}$, $\frac{35}{36}$, $\frac{49}{54}$, $2\frac{31}{72}$, $2\frac{29}{108}$
10. $3\frac{1}{9}$, $4\frac{5}{18}$, $5\frac{8}{27}$, $6\frac{38}{45}$, $7\frac{5}{81}$
11. $2\frac{1}{14}$, $2\frac{16}{21}$, $3\frac{3}{28}$, $3\frac{11}{35}$, $3\frac{19}{42}$, $3\frac{27}{49}$
12. $2\frac{1}{18}$, $3\frac{3}{26}$, $4\frac{35}{52}$, $5\frac{53}{65}$, $7\frac{11}{91}$

NOTE.—*Reduce mixed numbers to improper fractions. Find the L. C. M. of the numerators for the numerator of the required fraction, and the G. C. D. of the denominators for its denominator.*

### ARTICLE III.—CASE II.

### Addition of Fractions.

*Add the following:*

1. $\frac{2}{8}$, $\frac{4}{5}$, $\frac{5}{6}$, $\frac{9}{10}$, $\frac{14}{15}$
2. $\frac{3}{4}$, $\frac{5}{8}$, $\frac{7}{12}$, $\frac{9}{16}$, $\frac{19}{24}$
3. $\frac{1}{3}$, $\frac{3}{5}$, $\frac{5}{6}$, $\frac{7}{10}$, $\frac{8}{15}$
4. $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{8}$, $\frac{1}{12}$, $\frac{1}{24}$
5. $\frac{2}{8}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$, $\frac{15}{16}$, $\frac{23}{24}$, $\frac{47}{48}$
6. $\frac{3}{4}$, $\frac{4}{5}$, $\frac{7}{10}$, $\frac{5}{12}$, $\frac{8}{15}$, $\frac{11}{20}$, $\frac{17}{30}$, $\frac{31}{60}$
7. $\frac{3}{8}$, $\frac{5}{12}$, $\frac{7}{16}$, $\frac{13}{24}$, $\frac{19}{32}$, $\frac{25}{48}$, $\frac{47}{96}$
8. $\frac{5}{8}$, $\frac{7}{9}$, $\frac{11}{12}$, $\frac{9}{16}$, $\frac{13}{18}$, $\frac{17}{24}$, $\frac{25}{36}$, $\frac{43}{48}$, $\frac{55}{72}$
9. $\frac{2}{5}$, $\frac{3}{10}$, $\frac{4}{15}$, $\frac{8}{25}$, $\frac{11}{30}$, $\frac{16}{45}$, $\frac{19}{50}$
10. $1\frac{5}{8}$, $\frac{5}{9}$, $4\frac{5}{12}$, $\frac{5}{16}$, $7\frac{5}{18}$, $\frac{5}{24}$, $10\frac{5}{32}$, $\frac{5}{36}$, $13\frac{5}{48}$, $\frac{5}{72}$, $16\frac{5}{96}$
11. $\frac{5}{6}$, $\frac{6}{7}$, $\frac{8}{9}$, $\frac{13}{14}$, $\frac{17}{18}$, $\frac{20}{21}$, $\frac{41}{42}$, $\frac{62}{63}$, $\frac{101}{126}$

12. $\frac{1}{8}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{1}{10}$, $\frac{1}{15}$, $\frac{1}{25}$, $\frac{1}{30}$, $\frac{1}{50}$, $\frac{1}{75}$, $\frac{1}{150}$

13. $\frac{5}{32}$, $\frac{5}{36}$, $\frac{3}{40}$, $\frac{4}{45}$, $\frac{5}{48}$, $\frac{7}{60}$, $\frac{5}{72}$, $\frac{7}{80}$, $\frac{7}{120}$, $\frac{7}{144}$, $\frac{9}{160}$

14. $3\frac{1}{3}$, $3\frac{1}{5}$, $3\frac{1}{6}$, $3\frac{1}{10}$, $3\frac{1}{12}$, $3\frac{1}{15}$, $3\frac{1}{20}$

15. $2\frac{1}{2}$, $2\frac{1}{3}$, $2\frac{1}{6}$, $2\frac{1}{7}$, $2\frac{1}{14}$, $2\frac{1}{21}$, $2\frac{1}{42}$

16. $7\frac{4}{9}$, $8\frac{5}{18}$, $9\frac{7}{27}$, $10\frac{7}{36}$, $11\frac{8}{45}$, $12\frac{11}{54}$, $13\frac{19}{72}$, $14\frac{23}{90}$, $15\frac{25}{108}$

17. $1\frac{1}{2}$, $1\frac{2}{3}$, $1\frac{3}{4}$, $1\frac{4}{5}$, $1\frac{5}{6}$, $1\frac{7}{8}$, $1\frac{9}{10}$, $1\frac{11}{12}$, $1\frac{14}{15}$, $1\frac{19}{20}$, $1\frac{29}{30}$, $1\frac{49}{120}$

18. $1\frac{9}{14}$, $2\frac{11}{21}$, $3\frac{15}{28}$, $4\frac{25}{42}$, $5\frac{27}{56}$, $6\frac{47}{84}$, $7\frac{69}{168}$

19. $1\frac{1}{2}$, $2\frac{2}{3}$, $3\frac{3}{4}$, $4\frac{5}{6}$, $5\frac{4}{9}$, $6\frac{7}{12}$, $7\frac{5}{18}$, $8\frac{16}{27}$, $9\frac{19}{54}$

20. $1\frac{5}{9}$, $3\frac{7}{10}$, $5\frac{5}{12}$, $7\frac{8}{15}$, $9\frac{13}{20}$, $10\frac{17}{30}$, $12\frac{19}{36}$, $14\frac{32}{45}$, $16\frac{53}{60}$, $17\frac{41}{90}$

21. $45\frac{3}{10}$, $50\frac{7}{12}$, $65\frac{4}{15}$, $75\frac{9}{20}$, $85\frac{14}{25}$, $95\frac{17}{30}$, $100\frac{27}{50}$, $105\frac{41}{60}$, $115\frac{26}{75}$, $125\frac{39}{100}$, $135\frac{47}{150}$

22. If $11\frac{9}{16}$ be subtracted from a certain number, $13\frac{4}{5}$ will remain. What is the number?

23. A man spent $\$75\frac{3}{10}$, and then had $\$69\frac{3}{4}$ more than he spent. How much money had he at first?

24. Four loads of barley measured as follows: $35\frac{5}{8}$ bu., $33\frac{7}{16}$ bu., $36\frac{9}{32}$ bu., and $34\frac{17}{64}$ bu. How many bushels were there in all?

25. By selling a lot of tobacco for $\$256\frac{16}{25}$, I lost $\$32\frac{2}{5}$. For how much should it have been sold to gain $\$26\frac{23}{50}$?

26. A laborer's earnings for six consecutive months were respectively $\$42\frac{1}{2}$, $\$45\frac{3}{4}$, $\$48\frac{7}{10}$, $\$51\frac{11}{20}$, $\$54\frac{8}{25}$, $\$57\frac{9}{50}$. What was the entire sum?

27. A farmer sowed $7\frac{1}{6}$ acres in wheat, $8\frac{7}{8}$ acres in oats, $9\frac{5}{12}$ acres in rye, $10\frac{9}{16}$ acres in barley, $11\frac{11}{24}$ acres in corn, $12\frac{25}{48}$ acres in hay. How many acres did he own?

28. An engineer surveyed a road as follows: the first week $3\frac{2}{3}$ miles; the second, $4\frac{3}{4}$ miles; the third, $5\frac{4}{5}$ miles; the fourth, $6\frac{5}{6}$ miles; the fifth, $8\frac{9}{10}$ miles; the sixth, $9\frac{11}{12}$ miles; the seventh, $10\frac{2}{15}$ miles. What was the length of the road?

29. A can build $50\frac{2}{3}$ rods of fence in a week; B, $51\frac{3}{4}$ rods; C, $52\frac{5}{6}$ rods; D, $53\frac{8}{9}$ rods; E, $54\frac{11}{12}$ rods; F, $55\frac{17}{18}$ rods. How many rods can all build in a week.

30. Eight loads of hay weighed respectively $1\frac{1}{4}$ tons, $1\frac{2}{5}$ tons, $1\frac{3}{8}$ tons, $1\frac{3}{10}$ tons, $1\frac{7}{20}$ tons, $1\frac{8}{25}$ tons, $1\frac{17}{40}$ tons, $1\frac{19}{50}$ tons. What was the entire weight?

31. Six casks of wine were gauged as follows: $31\frac{1}{8}$ gal., $34\frac{2}{9}$ gal., $33\frac{5}{12}$ gal., $35\frac{7}{16}$ gal., $32\frac{5}{18}$ gal., $33\frac{25}{48}$ gal. What was the total number?

32. A steamship made seven trips across the Atlantic. The first in $13\frac{13}{24}$ days, the second in $12\frac{7}{18}$ days, the third in $11\frac{5}{8}$ days, the fourth in $10\frac{1}{6}$ days, the fifth in $9\frac{5}{12}$ days, the sixth in $8\frac{8}{9}$ days, the seventh in $7\frac{11}{36}$ days. In how many days were the seven trips made?

33. Five cars of wheat contained respectively $400\frac{1}{2}$ bu., $422\frac{2}{5}$ bu., $437\frac{5}{8}$ bu., $445\frac{9}{10}$ bu., $451\frac{5}{6}$ bu. They were sold for $\$333\frac{3}{4}$, $\$369\frac{3}{5}$, $\$364\frac{11}{16}$, $\$408\frac{37}{40}$, and $\$406\frac{13}{20}$. How many bushels were there, and what was the total value?

34. Four miners dug the following quantities of gold: The first dug $18\frac{9}{10}$ oz.; the second, $2\frac{5}{8}$ oz. more than the first; the third, $2\frac{3}{20}$ oz. more than the second; and the fourth, $2\frac{19}{40}$ oz. more than the third. How much did they dig altogether?

## Article 114.—Case II.

### Subtraction of Fractions.

*What is the difference between*

1. $\frac{5}{8}$ and $\frac{11}{12}$?
2. $\frac{7}{12}$ and $\frac{4}{9}$?
3. $\frac{9}{16}$ and $\frac{13}{24}$?
4. $\frac{11}{15}$ and $\frac{5}{9}$?
5. $\frac{9}{10}$ and $\frac{21}{25}$?

6. $\frac{7}{18}$ and $\frac{16}{45}$?
7. $\frac{13}{16}$ and $\frac{27}{40}$?
8. $\frac{14}{15}$ and $\frac{17}{24}$?
9. $\frac{11}{12}$ and $\frac{25}{82}$?
10. $\frac{48}{65}$ and $\frac{15}{26}$?
11. Subtract $8\frac{5}{9}$ from $10\frac{19}{24}$.
12. Subtract $12\frac{9}{20}$ from $16\frac{16}{25}$.
13. Subtract $22\frac{18}{18}$ from $33\frac{11}{16}$.
14. Subtract $50\frac{8}{15}$ from $75\frac{21}{50}$.
15. Subtract $100\frac{15}{22}$ from $200\frac{18}{55}$.
16. From $222\frac{65}{96}$ take $110\frac{55}{64}$.
17. From $375\frac{53}{72}$ take $210\frac{95}{108}$
18. From $888\frac{8}{9}$ take $443\frac{68}{75}$.
19. From $967\frac{24}{65}$ take $666\frac{25}{39}$.
20. From 1000 take $\frac{1}{1000}$.
21. What is the difference between $\frac{22}{838}$ and $\frac{27}{407}$?
22. $300 - 66\frac{4}{9} - 55\frac{11}{18} - 44\frac{19}{30} - 33\frac{14}{45} =$ what?
23. $68\frac{3}{4} - 17\frac{9}{10} - (7\frac{3}{20} + 8\frac{7}{25} + 9\frac{31}{50}) =$ what?
24. $6\frac{3}{5} + 5\frac{5}{9} - (15\frac{8}{15} - 10\frac{2}{45}) =$ what?
25. What fraction added to $\frac{64}{1313}$ will equal $\frac{85}{171}$?
26. The greater of two numbers is $127\frac{40}{221}$, and their difference is $32\frac{37}{255}$. Find the smaller number.
27. A worked $22\frac{31}{48}$ days, and B $19\frac{29}{60}$ days. How much longer did A work than B?
28. C husked $100\frac{29}{40}$ bu. of corn, and D $1\frac{11}{24}$ bu. less. How many bushels did both husk?
29. A certain number is as much less than $8\frac{3}{8}$ as $10\frac{19}{20}$ is greater than $6\frac{2}{5}$. What is that number?
30. There is a number which is as much less than $39\frac{5}{12}$ as $60\frac{17}{24}$ is greater than $46\frac{13}{16}$. Find the number.
31. A trader sold a horse for $\$125\frac{9}{10}$, by which he gained $\$10\frac{1}{2}$. How much would he have gained had he sold him for $\$140\frac{2}{5}$?
32. A can do a piece of work in $9\frac{2}{9}$ days; B can do

the same work in $1\frac{3}{5}$ days less, and C can do it in $1\frac{8}{15}$ days less than B. In what time can C do it?

33. From a barrel of flour there was taken at one time $50\frac{7}{8}$ lb., and at another $45\frac{9}{40}$ lb. How many pounds remained in the barrel?

34. A lady bought some dress goods for $\$12\frac{3}{4}$, trimmings for $\$5\frac{2}{5}$, gloves for $\$1\frac{7}{10}$, lace for $\$3\frac{3}{20}$, and muslin for $\$2\frac{8}{25}$; she gave the clerk a fifty-dollar bill, and received $\$24\frac{29}{50}$ change. How much was this incorrect?

35. A owns $82\frac{3}{16}$ acres of land, which is $11\frac{11}{20}$ acres more than B's. If C's is $73\frac{37}{80}$ acres less than A's and B's combined, how many acres have B and C together?

36. A laborer worked $25\frac{7}{12}$ days in June, $2\frac{31}{48}$ days less in July, and $4\frac{19}{24}$ days less in August than in July. How many days did he work altogether?

37. C built $144\frac{15}{44}$ rods of fence, D $12\frac{16}{55}$ rods less, and E built $8\frac{97}{220}$ rods less than B. How many rods did all build?

38. A man lost $\$17\frac{3}{4}$; he afterward borrowed $\$17\frac{19}{25}$, and then had \$100. How much had he at first?

## ARTICLE 115.

## Multiplication of Fractions.

*Find the product of*

1. $\frac{3}{8}$, $\frac{5}{9}$, $\frac{16}{25}$
2. $\frac{7}{11}$, $\frac{12}{35}$, $\frac{25}{36}$
3. $\frac{5}{6}$, $\frac{8}{15}$, $\frac{27}{32}$, $\frac{24}{25}$
4. $\frac{11}{12}$, $\frac{15}{22}$, $\frac{19}{45}$, $\frac{27}{49}$, $\frac{28}{57}$
5. $\frac{13}{17}$, $\frac{25}{32}$, $\frac{51}{55}$, $\frac{48}{65}$, $\frac{44}{81}$
6. $\frac{7}{18}$, $\frac{28}{39}$, $\frac{25}{42}$, $\frac{27}{50}$, $\frac{48}{49}$, $\frac{13}{56}$
7. $\frac{15}{8}$, $\frac{14}{13}$, $\frac{18}{19}$, $\frac{88}{21}$, $\frac{4}{25}$, $\frac{65}{86}$
8. $\frac{35}{18}$, $\frac{25}{21}$, $\frac{64}{27}$, $\frac{57}{50}$, $\frac{63}{52}$, $\frac{78}{55}$ $\frac{99}{76}$
9. $\frac{10}{7}$, $\frac{74}{63}$, $\frac{129}{65}$, $\frac{98}{75}$, $\frac{91}{86}$, $\frac{125}{84}$, $\frac{162}{111}$

10. $\frac{9}{2}\frac{3}{3}$, $\frac{10}{2}\frac{5}{9}$, $\frac{8}{8}\frac{7}{1}$, $\frac{7}{5}\frac{6}{1}$, $\frac{8}{8}\frac{5}{4}$, $\frac{9}{5}\frac{2}{7}$

11. $1\frac{1}{2}$, $3\frac{1}{3}$, $5\frac{1}{4}$, $6\frac{2}{5}$, $7\frac{1}{7}$

12. $\frac{8}{9}$, $1\frac{2}{3}$, $3\frac{3}{4}$, $4\frac{4}{5}$, $5\frac{5}{6}$, $6\frac{6}{7}$

13. $1\frac{1}{6}$, $1\frac{1}{7}$, $1\frac{1}{8}$, $1\frac{1}{9}$, $1\frac{1}{10}$, $1\frac{1}{11}$, $1\frac{1}{12}$, $1\frac{1}{13}$, $1\frac{1}{14}$

14. $\frac{1}{3}$, $\frac{2}{5}$, $2\frac{2}{7}$, $\frac{8}{9}$, $\frac{4}{11}$

15. $2\frac{1}{2}$, $2\frac{2}{3}$, $2\frac{4}{5}$, $2\frac{2}{7}$, $2\frac{5}{8}$, $2\frac{2}{9}$, $2\frac{7}{10}$, $1\frac{41}{84}$

16. $3\frac{3}{4}$, $\frac{64}{225}$, $33\frac{1}{3}$, $\frac{25}{96}$, $18\frac{3}{4}$, $\frac{32}{125}$

17. 12, $1\frac{3}{45}$, $4\frac{11}{25}$, $\frac{5}{81}$, $2\frac{1}{37}$, $\frac{16}{125}$, $2\frac{31}{52}$

18. $\frac{8}{15}$, $(6\frac{2}{3}-2\frac{1}{2})$, $\frac{9}{16}$, $(9\frac{3}{5}-7\frac{1}{2})$

19. $\frac{12}{25}$, $(8\frac{8}{9}+3\frac{1}{3})$, $\frac{15}{68}$, $(9\frac{1}{11}+2\frac{1}{2})$

20. $56\frac{1}{4}$, $(5\frac{5}{11}+1\frac{2}{3})$, $\frac{128}{141}$, $(12\frac{1}{2}-5\frac{5}{8})$

21. $(66\frac{2}{3}-44\frac{4}{9})$, $(43\frac{3}{4}-37\frac{1}{2})$, $(12\frac{4}{25}-11\frac{37}{50})$, $(\frac{23}{35}-\frac{16}{25})$

## Article 118.

### Promiscuous Examples.

*Find the cost of*

1. $4\frac{1}{2}$ lb. of starch at $6\frac{2}{3}$ cts. a pound.
2. $10\frac{2}{3}$ oz. silver bullion at $82\frac{1}{2}$ cts. an ounce.
3. $15\frac{3}{4}$ bu. of wheat at $83\frac{1}{3}$ cts. a bushel.
4. $19\frac{3}{8}$ lb. of flour at $4\frac{4}{5}$ cts. a pound.
5. $66\frac{2}{3}$ rods of fence at $97\frac{1}{2}$ cts. a rod.
6. $24\frac{3}{4}$ yds. of cloth at $\$1\frac{2}{5}$ a yard.
7. $13\frac{7}{8}$ acres of land at $\$53\frac{1}{3}$ an acre.
8. $12\frac{3}{5}$ oz. of gold at $\$18\frac{1}{2}$ an ounce.
9. $101\frac{9}{16}$ lb. of tobacco at $44\frac{4}{5}$ cts. a pound.
10. $8\frac{13}{20}$ tons of hay at $\$13\frac{1}{5}$ a ton.
11. $54\frac{9}{16}$ bls. of oil at $\$8\frac{8}{25}$ a barrel.
12. $266\frac{2}{3}$ bu. of salt at $37\frac{1}{2}$ cts. a bushel.
13. $7\frac{11}{12}$ lb. of opium at $\$9\frac{9}{25}$ a pound.
14. $57\frac{5}{9}$ yds. of flannel at $24\frac{3}{4}$ cts. a yard.
15. $156\frac{1}{4}$ gal. of brandy at $\$6\frac{2}{5}$ a gallon.
16. $53\frac{1}{3}$ cu. ft. of stone at $18\frac{3}{4}$ cts. a cubic foot.
17. $318\frac{8}{9}$ cu. yds. of excavation at $11\frac{1}{4}$ cts. a cubic yard.

18. $10\frac{9}{16}$ days work at $\$2\frac{2}{5}$ a day.

19. $19\frac{2}{3}$ doz. eggs at $22\frac{1}{2}$ cts. a dozen.

20. $13\frac{9}{32}$ bu. of plums at $\$1\frac{2}{25}$ a bushel.

21. $35\frac{5}{64}$ cords of wood at $\$3\frac{1}{5}$ a cord.

22. What number divided by $6\frac{3}{4}$ will give $13\frac{1}{3}$ for a quotient?

23. Find the cost of $325\frac{4}{5}$ bu. of wheat at $\$1.16\frac{2}{3}$ per bushel.

24. A pedestrian accomplished a journey in $8\frac{8}{9}$ days of $10\frac{1}{2}$ hrs. each, at the rate of $3\frac{3}{5}$ miles per hour. What was the distance?

25. A speculator owning $155\frac{5}{8}$ acres of land, exchanged $\frac{4}{15}$ of it for flour, at the rate of $12\frac{1}{2}$ bls. per acre. How many barrels did he receive?

26. A farmer sold $6\frac{2}{3}$ casks of cider, each containing $27\frac{3}{8}$ gal., at $48\frac{4}{5}$ cts. a gallon. What did he receive for it?

27. A clerk earned $\frac{3}{4}\frac{2}{5}$ of $\frac{1}{2}\frac{8}{5}$ of $\$156\frac{1}{4}$ a month for $10\frac{1}{2}$ mo., and saved $\frac{1}{2}\frac{5}{8}$ of it. How much did he save?

28. Hay worth $\$18\frac{3}{4}$ a ton was sold for $\frac{5}{6}$ of its value. What was received for $\frac{1}{2}\frac{4}{5}$ of $9\frac{1}{5}$ tons?

29. Find the value of a block of marble 6 ft. 6 in. long, 5 ft. 4 in. wide, and 4 ft. 3 in. thick, at $\$3\frac{3}{8}$ a cubic foot.

30. A wholesale merchant imported 12 boxes of broadcloth, each containing $12\frac{1}{2}$ bolts of $31\frac{1}{4}$ yds. per bolt, at a cost of $\$2\frac{5}{6}$ per yard. What was the value of the cloth?

31. Two steamers started at the same time, one from Pittsburg to Cairo, at the rate of $11\frac{1}{2}$ miles per hour; the other from Cairo to Pittsburg, at the rate of $9\frac{3}{10}$ miles per hour. If they met in $46\frac{7}{8}$ hrs., what is the distance from Pittsburg to Cairo?

32. Find the cost of excavating a cellar 33 ft. 4 in. long, 20 ft. 3 in. wide, and 6 ft. 6 in. deep, at $\$1\frac{2}{2}\frac{8}{5}$ a cubic yard.

33. A retail merchant bought $69\frac{3}{8}$ yds. of silk at $\$1\frac{9}{20}$ a yard, but was obliged to sell $\frac{2}{3}$ of it for $\frac{4}{5}$ of its value. How much did he receive for it?

34. A room is $18\frac{3}{4}$ ft. long, and $15\frac{3}{4}$ ft. wide. Find the cost of carpeting the floor, at $\$1\frac{3}{5}$ a square yard.

35. A owns $56\frac{1}{4}$ acres of land, B owns $\frac{9}{10}$ as much as A, C has $\frac{24}{25}$ as much as B, and D $\frac{11}{12}$ as much as C. How many acres have all together?

## Article 119.

### Division of Fractions.

1. Divide $\frac{8}{9}$ by $\frac{2}{3}$.
2. Divide $\frac{2}{5}$ by $3\frac{1}{8}$.
3. Divide $8\frac{1}{3}$ by $\frac{5}{12}$.
4. Divide $77\frac{7}{9}$ by $83\frac{1}{3}$.
5. Divide $16\frac{1}{5}$ by $3\frac{3}{8}$.
6. Divide $5\frac{1}{15}$ by $24\frac{7}{10}$.
7. Divide $68\frac{3}{4}$ by $1\frac{7}{18}$.
8. Divide $15\frac{16}{25}$ by $24\frac{8}{15}$.
9. Divide $99\frac{9}{10}$ by $3\frac{13}{45}$.
10. Divide $8\frac{10}{11}$ by $9\frac{3}{16}$.
11. Divide $18\frac{3}{29}$ by $2\frac{1}{87}$.
12. Divide $3\frac{2}{17}$ by $2\frac{4}{51}$.
13. Divide 500 by $\frac{4}{9}$.
14. Divide $\frac{7}{8}$ by 385.
15. Divide $481\frac{1}{4}$ by $137\frac{1}{2}$.
16. Divide $\frac{2}{5}$ of $\frac{7}{8}$ of $\frac{4}{9}$ of $2\frac{11}{12}$ by $\frac{14}{25}$ of $\frac{5}{16} \times \frac{1}{8}$ of 7
17. Divide $6\frac{2}{3} \times 6\frac{3}{4} \times 6\frac{2}{5} \times 6\frac{1}{6}$ by $10\frac{2}{7} \times 4\frac{14}{15} \times 2\frac{3}{16} \times 1\frac{3}{5}$.
18. Divide $\frac{10}{11}$ of $\frac{64}{75}$ of $\frac{81}{82}$ of $66\frac{2}{3}$ by $\frac{32}{123}$ of $1\frac{53}{55}$.
19. Divide $268\frac{3}{4} \times 444\frac{4}{9}$ by $\frac{43}{188}$ of $383\frac{1}{5}$.
20. Divide $226\frac{2}{8} \times 90\frac{10}{11}$ by $\frac{153}{275}$ of $32\frac{19}{27}$.
21. Divide $55\frac{5}{9} \times \frac{198}{625}$ by $83\frac{1}{3} \times 15\frac{21}{25}$.

22. If 15 men share $\$238\frac{1}{2}$ equally, what will each receive?

23. How many oranges, at $3\frac{1}{3}$ cts. each, can be bought for 90 cts.?

24. When flour is $\$6\frac{1}{4}$ a barrel, what part of a barrel will cost $\$3\frac{3}{4}$?

25. How much sugar, at $6\frac{3}{4}$ cts. a pound, can be bought for 81 cts?

26. If a pigeon fly $166\frac{2}{3}$ miles in $12\frac{1}{2}$ hours, what is the rate per hour?

27. In how many days can a laborer earn $\$20\frac{1}{4}$ at $\$1\frac{4}{5}$ per day?

28. At $\$68\frac{4}{5}$ per acre, how many acres can be purchased for $\$1290$?

29. By what must $133\frac{1}{3}$ be multiplied that the product shall be $222\frac{2}{9}$?

30. If $93\frac{1}{3}$ rods of fence cost $\$100\frac{4}{5}$, what was the cost per rod.

31. How many cords of wood can a laborer cut in a day, if he can cut $62\frac{1}{2}$ cords in $33\frac{1}{3}$ days?

32. $\$163\frac{21}{25}$ was paid for hay, at $\$12\frac{4}{5}$ a ton. How many tons were bought?

33. A man owning $93\frac{3}{4}$ acres of land, sold $\frac{9}{20}$ of it for $\$2733\frac{3}{4}$. What was the price per acre?

34. If $3\frac{3}{8}$ yds. of cloth cost $\$8\frac{1}{10}$, how many yards can be bought for $\$63\frac{3}{5}$?

35. If a man can build $25\frac{2}{15}$ rods of fence in $5\frac{7}{9}$ days, how many rods can he build in $8\frac{1}{3}$ days?

36. A plows $7\frac{1}{2}$ acres while B plows $6\frac{3}{5}$ acres. How many acres will B have finished when A has plowed $27\frac{1}{2}$ acres.

37. If $5\frac{5}{8}$ bu. of apples produce $13\frac{1}{2}$ gal. of cider, how many bushels will yield 100 gal.?

38. $\$57\frac{3}{4}$ was paid for $10\frac{1}{2}$ cords of wood. At the same rate how many cords would cost $\$700\frac{7}{10}$?

39. If an engine can saw $2\frac{2}{3}$ ft. of logs in a minute, what time would it require to saw 75 logs, each $25\frac{3}{5}$ ft. long?

40. A farmer raised $31\frac{1}{2}$ tons of hay on $16\frac{4}{5}$ acres. At the same rate how many acres should yield $93\frac{3}{4}$ tons?

41. If a man can do $\frac{1}{2}\frac{2}{5}$ of a piece of work in $9\frac{9}{10}$ days, what part of it can he do in $13\frac{3}{4}$ days?

42. 5 men can do a piece of work in $34\frac{7}{8}$ days. How many can do the same work in $9\frac{11}{16}$ days?

## Article 120.

*To find what part one number is of another.*

1. $18\frac{3}{4}$ is what part of 30?
2. 20 is what part of $33\frac{1}{3}$?
3. $26\frac{2}{3}$ is what part of 60?
4. 45 is what part of $56\frac{1}{4}$?
5. $3\frac{3}{8}$ is what part of $7\frac{1}{5}$?
6. $8\frac{5}{9}$ is what part of $9\frac{5}{8}$?
7. $43\frac{3}{4}$ is what part of $77\frac{7}{9}$?
8. What part of $83\frac{1}{3}$ is $53\frac{1}{3}$?
9. What part of $19\frac{11}{16}$ is 14?
10. What part of $147\frac{2}{5}$ is $111\frac{2}{3}$?
11. What part of $89\frac{2}{7}$ is $87\frac{1}{2}$?
12. What part of $48\frac{9}{17}$ is 44?
13. What part of $69\frac{3}{10}$ is $47\frac{1}{4}$?
14. $\frac{8}{15}$ of $8\frac{1}{3}$ is what part of $\frac{2}{3}\frac{5}{6}$ of $12\frac{4}{5}$?
15. $\frac{5}{12}$ of $8\frac{4}{7}$ is what part of $\frac{6}{7}$ of $8\frac{8}{9}$?
16. $\frac{7}{45}$ of $37\frac{1}{2}$ is what part of $\frac{50}{81}$ of $37\frac{4}{5}$?
17. $\frac{3}{4}$ of $10\frac{1}{9}$ is what part of $\frac{7}{10}$ of $10\frac{5}{6}$?
18. $\frac{15}{16} \div 3\frac{1}{8}$ is what part of $\frac{24}{25} \div 2\frac{2}{5}$?
19. $\frac{13}{18} \div 5\frac{5}{9}$ is what part of $\frac{26}{75} \div 2\frac{1}{6}$?
20. $\frac{16}{45} \div 22\frac{2}{9}$ is what part of $\frac{25}{64} \div 18\frac{3}{4}$?

NOTE.—*It will be observed that the number following the preposition "of" is always the divisor or denominator.*

## ARTICLE 121.

### Reduction of Complex Fractions.

*Reduce the following to simple fractions.*

1. $\frac{\frac{5}{8}}{\frac{9}{10}}$

2. $\frac{1\frac{1}{2}}{4\frac{4}{5}}$

3. $\frac{3\frac{1}{3}}{7\frac{1}{2}}$

4. $\frac{9\frac{3}{5}}{36}$

5. $\frac{9\frac{1}{11}}{11\frac{1}{9}}$

6. $\frac{12\frac{4}{7}}{8\frac{4}{5}}$

7. $\frac{32}{7\frac{1}{17}}$

8. $\frac{1\frac{5}{16}}{18\frac{3}{4}}$

9. $\frac{9\frac{9}{10}}{88}$

10. $\frac{25}{5\frac{5}{9}}$

11. $\frac{66\frac{2}{3}}{56\frac{1}{4}}$

12. $\frac{19\frac{2}{7}}{45}$

13. $\frac{10\frac{1}{11}}{11\frac{1}{10}}$

14. $\frac{68\frac{3}{4}}{83\frac{1}{3}}$

15. $\frac{77\frac{7}{9}}{116\frac{2}{3}}$

16. $\frac{93\frac{3}{4}}{125}$

17. $\frac{300}{2\frac{2}{5}}$

18. $\frac{58\frac{1}{7}}{555}$

19. $\frac{175}{46\frac{2}{3}}$

20. $\frac{75\frac{5}{8}}{10\frac{1}{12}}$

## ARTICLE 122.

### Complex Fractions.

1. If the multiplicand is $6\frac{3}{4}$, and the product $4\frac{4}{5}$, what is the multiplier?

2. The quotient is $31\frac{1}{4}$, and the dividend 195. What is the divisor?

3. The product is $99\frac{9}{10}$, and the multiplier $101\frac{1}{4}$. What is the multiplicand?

4. The dividend is $67\frac{1}{5}$, and the divisor $18\frac{8}{25}$. What is the quotient?

5. A farmer having a crop of wheat worth $\$493\frac{1}{2}$, sold a part of it for $\$263\frac{1}{5}$. What part of the crop did he sell?

6. A and B bought a barrel of cider for $\$5\frac{3}{5}$. A paid $\$3\frac{1}{2}$, B the remainder. What part of the cider should each take?

7. Paid $\$33\frac{3}{4}$ for cloth, at $\$3\frac{3}{5}$ a yard. How many yards did I buy?

8. Bought $12\frac{3}{16}$ cords of wood for $\$58\frac{1}{2}$. What was the price per cord?

9. $15\frac{5}{8}$ tons of anthracite coal cost $\$106\frac{1}{4}$. How many tons would cost $\$85$?

10. Owning $56\frac{1}{4}$ acres of land, I sold $\frac{12}{25}$ of it for $\$1350$. What was the price per acre?

11. A jeweler paid $\$158\frac{2}{5}$ for gold, at $\$1\frac{1}{10}$ a pennyweight, which he made into rings weighing $4\frac{1}{2}$ pwt. each. How many rings did he make?

12. Paid $\$65\frac{1}{4}$ for sheep, at $\$3\frac{5}{8}$ each. At that rate how many could be bought for $\$362\frac{1}{2}$?

13. A farmer sold $\frac{4}{5}$ of $8\frac{7}{16}$ cords of wood for $\frac{8}{15}$ of $\$60\frac{3}{4}$. What was the price per cord?

14. Paid $\$110$ for $45\frac{5}{6}$ bl. of apples, and sold $22\frac{1}{2}$ bl. for $\$50$. Find my loss by the sale?

15. A lady paid $\$62$ for carpeting, at $\$1\frac{3}{5}$ per yard. Had she paid $\$72$, how many yards would she have received?

16. Owning $\frac{9}{16}$ of a farm worth $\$4500$, what part of my share should I sell for $\$1620$?

17. Paid $\$2\frac{2}{5}$ a box for lemons, but sold them at $\frac{7}{8}$ of the cost. How many boxes were sold for $\$42$?

18. If $15\frac{5}{8}$ gal. of wine cost $\$33\frac{3}{4}$, how many gallons would cost $\$162$?

19. A and B built a fence for $\$20\frac{2}{3}$. A worked $3\frac{3}{4}$ days and built $12\frac{1}{2}$ rods. B worked as many days as A built rods per day. What should each receive?

20. $\frac{5}{6}$ of $\frac{19\frac{14}{15}}{28\frac{8}{9}}$ divided by $\frac{33}{50}$ of $\frac{20\frac{4}{9}}{17\frac{2}{5}}$ = what?

## Article 124.

### Reduction to Lower Denominations.

1. Reduce $\frac{7}{512}$ bu. to the fraction of a pint.
2. Reduce $\frac{3}{160}$ gal. to the fraction of a gill.
3. Reduce $\frac{1}{2500}$ cwt. to the fraction of an ounce.
4. Reduce $\frac{1}{9680}$ acres to the fraction of a square
5. Reduce $\frac{1}{7040}$ mile to the fraction of a yard.
6. Reduce $\frac{3}{1024}$ cord to the fraction of a cubic foot.
7. Reduce $\frac{7}{10800}$ day to the fraction of a minute.
8. Reduce $\frac{1}{7200}$ lb. Troy to the fraction of a grain.
9. Reduce $\frac{1}{6409}$ lb. Apothecary to the fraction of a grain.
10. Reduce $\frac{1}{480000}$ ton to the fraction of an ounce.
11. Reduce $\frac{3}{100}$ bu. to the fraction of a quart.
12. Reduce $\frac{5}{256}$ gal. to the fraction of a pint.
13. Reduce $\frac{3}{100000}$ ton to the fraction of an ounce.
14. Reduce $\frac{7}{3520000}$ acre to the fraction of a square foot.
15. Reduce $\frac{1}{63360}$ mile to the fraction of a foot.
16. Reduce $\frac{1}{622028}$ cu. yd. to the fraction of a cubic inch.
17. Reduce $\frac{1}{224400}$ week to the fraction of a minute.
18. Reduce $\frac{7}{864000}$ lb. Troy to the fraction of a grain.
19. Reduce $\frac{13}{921600}$ lb. Apothecary to the fraction of a grain.
20. Reduce $\frac{3}{80641}$ hhd. to the fraction of a gill.

## Article 125.

### Reduction to Lower Denominations.

*Reduce the following to integers.*

1. $\frac{19}{64}$ bu.
2. $\frac{31}{32}$ gal.
3. $\frac{21}{160}$ ton.
4. $\frac{9}{22}$ acre.
5. $\frac{50}{99}$ mile.
6. $\frac{11}{18}$ cord.
7. $\frac{75}{128}$ week.
8. $\frac{99}{320}$ lb. Troy.
9. $\frac{121}{192}$ lb. Apoth.
10. $\frac{383}{800}$ ton.
11. $\frac{127}{128}$ bu.
12. $\frac{125}{256}$ gal.
13. $\frac{175}{396}$ mile.
14. $\frac{75}{121}$ sq. mile.
15. $\frac{95}{108}$ cord.
16. $\frac{125}{432}$ cu. yd.
17. $\frac{64}{225}$ week.
18. $\frac{249}{640}$ lb. Troy.
19. $\frac{143}{384}$ lb. Apoth.
20. $\frac{11111}{20016}$ hhd.

## Article 126.

### Reduction to Higher Denominations.

1. Reduce $\frac{2}{8}$ pt. to the fraction of a bushel.
2. Reduce $\frac{4}{5}$ gill to the fraction of a gallon.
3. Reduce $\frac{32}{33}$ oz. to the fraction of a hundredweight.
4. Reduce $\frac{33}{40}$ in. to the fraction of a rod.
5. Reduce $\frac{1121}{1124}$ sq. ft. to the fraction of a square rod.
6. Reduce $\frac{9}{10}$ cu. in. to the fraction of a cubic yard.
7. Reduce $\frac{16}{25}$ min. to the fraction of a week.
8. Reduce $\frac{5}{6}$ gr. to the fraction of a pound, Troy.
9. Reduce $\frac{24}{25}$ gr. to the fraction of a pound, Apoth.
10. Reduce $\frac{21}{22}$ gill to the fraction of a hogshead.
11. Reduce $\frac{24}{25}$ pt. to the fraction of a bushel.
12. Reduce $\frac{64}{75}$ gill to the fraction of a gallon.
13. Reduce $\frac{32}{35}$ lb. to the fraction of a ton.
14. Reduce $\frac{99}{100}$ ft. to the fraction of a mile.

15. Reduce $\frac{363}{400}$ sq. yd. to the fraction of an acre.
16. Reduce $\frac{88}{125}$ cu. ft. to the fraction of a cord.
17. Reduce $\frac{168}{175}$ min. to the fraction of a day.
18. Reduce $\frac{64}{125}$ pwt. to the fraction of a pound.
19. Reduce $\frac{54}{55}$ ℈ to the fraction of a pound.
20. Reduce $\frac{567}{625}$ pt. to the fraction of a hogshead.

## Article 127.

1. Reduce 2 pks. 6 qts. 1 pt. to the fraction of a bushel.
2. Reduce 3 qts. 1 pt. 2 gills to the fraction of a gallon.
3. Reduce 17 cwt. 96 lb. 14 oz to the fraction of a ton.
4. Reduce 4 yds. 2 ft. 2 in. to the fraction of a rod.
5. Reduce 88 sq. rods 26 sq. yds. 8 sq. ft. to the fraction of an acre.
6. Reduce 72 cu. ft. to the fraction of a cord.
7. Reduce 9 hrs. 22 min. 30 sec. to the fraction of a day.
8. Reduce 11 oz. 14 pwt. 16 gr. to the fraction of a pound.
9. Reduce 9 ℥ 3 ʒ 1 ℈ 16 gr. to the fraction of a pound.
10. Reduce 21 gal. 3 qts. 1 pt. to the fraction of a hogshead.
11. What part of 2 bu. 2 pks. 4 qts. is 1 bu. 2 pks. 4 qts. 1 pt.?
12. What part of 4 gal. 2 qts. 1 pt. 2 gills is 3 gal. 1 qt. 1 gill?
13. What part of 3 cwt. 25 lb. 2 oz. is 1 cwt. 80 lb. 10 oz.?
14. 4 yds. 2 ft. 8 in. is what part of 6 yds. 2 ft. 2 in.?

15. 11 acres, 40 sq. rods 20 sq. yds. is what part of 13 acres 80 sq. rods 24 sq. yds.?

16. 15 cu. yds. 8 cu. ft. is what part of 5 cords 68 cu. ft.?

17. What part is 4 days 7 hrs. 15 min. of 5 days 17 hrs. 40 min.?

18. What part is 15 lb. 7 oz. 12 pwt. of 27 lb. 4 oz. 6 pwt.?

19. What part is 5 lb. 5 ℥ 6 ʒ 2 ℈ of 6 lb. 10 ℥ 2 ʒ 1 ℈?

20. 17 gal. 1 qt. 1 pt. 2 gills is what fraction of 21 gal. 1 qt. 2 gills?

21. What fraction of 9 lb. 10 oz. 7 pwt. $10\frac{2}{11}$ gr. is 2 lb. 4 oz. 18 pwt. $16\frac{8}{9}$ gr?

NOTE.—*The number following the preposition "of" is the divisor.*

## ARTICLE 128.

1. $\frac{45}{64}$ bu. + $\frac{15}{32}$ pk. + $\frac{3}{4}$ qt. = ?
2. $\frac{4}{5}$ gal. + $\frac{4}{5}$ qt. + $\frac{4}{5}$ pt. + $\frac{4}{5}$ gill = ?
3. $\frac{99}{320}$ ton + $\frac{99}{160}$ cwt. + $\frac{9}{16}$ lb. = ?
4. $\frac{3}{11}$ mile + $\frac{5}{11}$ rod + $\frac{5}{6}$ yd. + $\frac{5}{6}$ ft. = ?
5. $\frac{25}{33}$ acre + $\frac{25}{33}$ sq. rod + $\frac{11}{16}$ sq. yd. + $\frac{11}{16}$ sq. ft. = ?
6. $\frac{5}{9}$ week + $\frac{5}{27}$ day + $\frac{5}{18}$ hr. + $\frac{5}{12}$ min. = ?
7. $\frac{125}{128}$ lb. + $\frac{25}{32}$ oz. + $\frac{5}{8}$ pwt. = ?
8. $\frac{13}{216}$ cord + $\frac{49}{162}$ cu. yd. + $\frac{7}{54}$ cu. ft. = ?
9. $\frac{9}{25}$ lb. + $\frac{9}{25}$ ℥ + $\frac{9}{25}$ ʒ + $\frac{9}{25}$ ℈ + $\frac{4}{5}$ gr. = ?
10. $\frac{55}{64}$ bu. + $\frac{15}{32}$ pk. + $\frac{5}{8}$ qt. + $\frac{1}{4}$ pt. = ?
11. $\frac{169}{640}$ ton — $\frac{55}{64}$ cwt. = ?
12. $\frac{37}{99}$ mile — $\frac{17}{88}$ rod = ?
13. $\frac{115}{198}$ acre — $\frac{197}{242}$ sq. rod = ?
14. $\frac{75}{512}$ cord — $\frac{55}{96}$ cu. yd. = ?
15. $\frac{3889}{6400}$ lb. — $\frac{14}{15}$ oz. Troy = ?

16. $\frac{7}{10}$ lb.—$\frac{7}{10}$ $\frac{7}{3}$ = ?
17. $\frac{39}{64}$ bu.—$\frac{11}{16}$ pk. = ?
18. $\frac{125}{336}$ hhd.—$\frac{5}{8}$ qt. = ?
19. $\frac{49}{250}$ sq. mile—$\frac{17}{50}$ acre = ?
20. $\frac{7}{75}$ year—$\frac{21}{25}$ week = ?

## Article 129.

### Promiscuous Examples.

1. Reduce $\frac{11}{19}\frac{17}{6}\frac{81}{35}$ to its lowest terms.
2. Find the value in integers of $\frac{3}{11}$ of a square mile.
3. $\frac{15}{16}$ of $83\frac{1}{3}$ is what part of $62\frac{1}{2}$ times $1\frac{7}{8}$?
4. A field 56 rods wide contains 25 acres 88 sq. rods. Find the cost of fencing it, at $66\frac{2}{3}$ cts. a rod.
5. A clerk earned $\frac{6}{5}$ of $\frac{9}{10}$ of $\$66\frac{2}{3}$ a month for $7\frac{1}{2}$ mo., and saved $\frac{7}{12}$ of it. How much did he save?
6. $\frac{18\frac{3}{4}}{83\frac{1}{3}} \times \frac{49\frac{1}{2}}{75\frac{5}{8}} \div \frac{5\frac{2}{5}}{7\frac{6}{7}}$ = what?
7. $19\frac{3}{8} - 7\frac{11}{12} - (8\frac{5}{16} - 3\frac{17}{24})$ = what?
8. Reduce 2 days 11 hrs. 44 min. to the fraction of a week.
9. If $9\frac{3}{8}$ yds. of cloth cost $\$26\frac{1}{4}$, what would be the cost of $8\frac{5}{7}$ yds.?
10. If $27\frac{4}{5}$ bls. of flour cost $\$185\frac{1}{3}$, how many barrels could be bought for $\$124\frac{1}{6}$?
11. A man owning $\frac{7}{8}$ of a boat, sold $\frac{3}{4}$ of his share for $\$1785$. What was the value of the boat? What part had he left, and what was it worth?
12. A parlor is 24 ft. long, 18 ft. wide, and 12 ft. high. Find the total cost of plastering it, at $31\frac{1}{2}$ cts. a square yard, and of covering the floor with Brussels carpet ($\frac{3}{4}$ yd. wide), at $\$1.20$ a yard.
13. Find the amount of $\frac{7\frac{7}{8}}{12\frac{1}{4}}$ and $\frac{14\frac{2}{7}}{16\frac{2}{8}}$

14. What is the product of $\frac{9\frac{7}{9}}{7\frac{3}{5}}$ and $\frac{13\frac{4}{7}}{10\frac{10}{21}}$

15. A man built a house, paying $\$125\frac{1}{2}$ for masonry, $\$613\frac{3}{4}$ for brickwork, $\$587\frac{2}{5}$ for carpenter work, $\$180\frac{9}{10}$ for plastering, $\$165\frac{3}{20}$ for painting, $\$64\frac{6}{25}$ for grading, and $\$263\frac{3}{50}$ for other expenses. What was the entire cost?

16. If an engine can saw $2\frac{2}{3}$ ft. of logs in a minute, how long will it be in sawing 12 logs, each $13\frac{1}{3}$ ft. long?

17. A 45-gallon cask is $\frac{1}{12}$ full. If $13\frac{1}{8}$ gal. be drawn off, what part of the cask will remain filled?

18. If a pedestrian, by traveling $3\frac{3}{5}$ miles an hour, perform a journey in $8\frac{3}{4}$ hrs., in what time could he do it by traveling $4\frac{2}{3}$ miles an hour?

19. If a laborer can reap a field of grain in $4\frac{4}{5}$ days, how long would it take four laborers to reap a field $6\frac{1}{4}$ times as large?

20. Divide the product of $6\frac{2}{5}$ times $8\frac{8}{9}$ by the sum of $\frac{4}{15}$ and $\frac{8}{25}$.

21. Divide the product of $5\frac{5}{9}$ and $8\frac{1}{3}$ by their difference.

22. Four men performed a certain work for $\$1000$. The first received $\$240\frac{7}{10}$, the second $\$250\frac{12}{25}$, the third $\$260\frac{11}{50}$. What did the fourth receive?

23. In a partnership, A furnished $\frac{8}{21}$ of the capital, B $\frac{5}{14}$ of it, and C the remainder, which was $\$4125$. What was their entire capital?

24. Reduce 4 oz. 13 pwt. 8 gr. to the fraction of a pound.

25. If $18\frac{3}{4}$ tons of coal cost $\$86\frac{1}{4}$, what will be the cost of $16\frac{2}{3}$ tons?

26. If $5\frac{3}{4}$ cords of wood cost $\$38\frac{1}{3}$, how many cords can be bought for $\$62\frac{1}{2}$?

27. How many sods 20 in. long and 15 in. wide

would be required for a lawn $33\frac{1}{3}$ ft. wide and $97\frac{1}{2}$ ft. long?

28. In an orchard $\frac{3}{8}$ are apple trees, $\frac{2}{9}$ pear trees, $\frac{5}{24}$ peach trees, and the remainder, which is 42, plum trees. What is the number of peach trees?

29. A stick of timber was 18 ft. 9 in. long, and 18 in. square; $\frac{4}{15}$ of it was sawn off, and the remainder sold at $25\frac{3}{5}$ cts. a cubic foot. What was received for it?

30. A stock of goods costing $\$3125\frac{1}{4}$ caught fire. $\frac{2}{9}$ of it was destroyed; $\$368\frac{7}{20}$ worth was stolen; and the remainder, being damaged, was sold for $\frac{3}{4}$ of its value. How much was paid for it?

31. What number added to $\frac{7}{9}$ of $18\frac{3}{4}$ will equal $\frac{9}{10}$ of $41\frac{2}{8}$?

32. What number subtracted from $\frac{7}{10}$ of $142\frac{6}{7}$ will leave $\frac{5}{6}$ of $66\frac{2}{8}$?

33. What number multiplied by $62\frac{1}{2}$ will produce $3333\frac{1}{3}$?

34. What number divided by $25\frac{2}{25}$ will give $83\frac{1}{3}$ for a quotient?

35. A field is 95 rods long, and contains 46 acres 50 sq. rods. Find the cost of the fence surrounding it, at $\$\frac{7}{8}$ a rod.

36. I own $\frac{6}{7}$ of a farm, and sell $\frac{3}{5}$ of my share for $1530. What is my remaining interest worth?

37. Find the difference in the cost of carpeting two rooms, one 16 ft. wide by 25 ft. long, the other 17 ft. wide by 24 ft. long, with Brussels carpet, at $\$1.12\frac{1}{2}$ a yard.

38. A farmer having $\$380\frac{5}{8}$, gave $\frac{5}{7}$ of it for sheep, at $\$3\frac{5}{8}$ a head. How many did he buy?

39. A sum of money was divided among five persons. A received $\frac{2}{9}$, B $\frac{5}{18}$, C $\frac{7}{24}$, D $\frac{7}{36}$, and E the remainder, which was $25. Find the entire sum, and B's share.

40. Two men built $41\frac{2}{3}$ rods of fence in $5\frac{1}{2}$ days. At

the same rate, how many rods could three men build in $4\frac{2}{5}$ days?

41. If a pedestrian can walk $39\frac{1}{16}$ miles in $10\frac{5}{12}$ hrs., in how many hours can he walk $31\frac{1}{2}$ miles?

42. A trader bought $147\frac{6}{7}$ cords of wood, at $\$5\frac{1}{4}$ a cord, and gave in exchange horses, at $\$64\frac{11}{16}$ apiece. How many horses were required?

43. Multiply together $\frac{5}{8\frac{1}{3}}$ $\frac{7\frac{1}{9}}{11}$ $\frac{6\frac{2}{3}}{8\frac{3}{4}}$ $9\frac{5}{8}$ and $\frac{\frac{9}{16}}{1\frac{3}{5}}$.

44. A and B are $81\frac{1}{2}$ miles apart, and travel toward each other, A going $3\frac{3}{4}$ miles an hour, and B $4\frac{2}{5}$ miles. In how many hours will they meet, and how far will each have traveled?

45. A speculator built a block of stores on a lot valued at $\$5000$, paying $\$4521\frac{3}{4}$ for brick-work; $\$2978\frac{4}{5}$ for lumber; $\$3142\frac{9}{10}$ for labor; and $\$3356\frac{11}{20}$ for other expenses. He sold the block for $\$20000$. Find his gain.

46. If $9\frac{3}{8}$ acres produce $151\frac{7}{8}$ bu. of wheat, how many bushels would $13\frac{8}{9}$ acres produce?

47. If $14\frac{3}{10}$ acres yield $822\frac{1}{4}$ bu. of corn, how many acres would yield $1916\frac{2}{3}$ bu.?

48. A bookkeeper pays $\$18\frac{3}{4}$ a month for rent, which is $\frac{9}{40}$ of his salary. What is his yearly salary?

49. A merchant exchanged $18\frac{3}{4}$ bls. of flour, worth $\$3\frac{3}{5}$ a barrel, for hay at $\$13\frac{1}{2}$ a ton. How many tons of hay did he receive?

50. Sold 1000 bu. of grain for $\$375\frac{3}{10}$, thereby losing $\$74\frac{17}{25}$. Had I sold it at a gain of $\$50\frac{1}{80}$, how much per bushel would I have received?

51. A owns $62\frac{1}{2}$ acres, B $37\frac{1}{2}$ acres. If each sell $\frac{1}{25}$ of his land to the other, how many acres more will A have than B?

52. How many rugs 5 ft. 6 in. long and 2 ft. 8 in. wide will cover the floor of a drawing-room 33 ft. long and 24 ft. wide?

53. A pasture is 36 rods wide, and contains 10 acres 128 sq. rods. It is to be surrounded by a fence five boards high, each board being 6 in. in width. Find the value of the lumber, at $\$16.66\frac{2}{3}$ per thousand feet.

54. What part of a day is 5 hrs. 37 min. 30 sec.?

55. A trader gained $\frac{3}{10}$ of his capital in one speculation, and $\frac{9}{25}$ of that amount in another; but in a third he lost $\frac{5}{16}$ of all his money, and found that he had $\$1823\frac{1}{4}$ remaining. What was his original capital?

56. By selling a lot of groceries for $\$94\frac{3}{5}$, I made $\frac{3}{8}$ of the cost. I paid for them with apples, at $\$2\frac{3}{10}$ a barrel, and $\$34\frac{3}{10}$ in money. How many barrels of apples did I give?

57. A pile of wood is 85 ft. 4 in. long, 12 ft. wide, and 11 ft. 8 in. high. Find its value, at $\$4\frac{4}{5}$ a cord.

58. Bought a lot of marble for $\$240\frac{1}{2}$, which was $\frac{2}{15}$ less than its value. I sold it for $\frac{6}{25}$ more than its value. What was my gain?

59. Find the cost of 10 ℥ 6 ʒ 1 ℈ 4 gr. of opium at $\$10\frac{1}{2}$ a pound.

60. Find the value in integers of $\frac{4}{25}$ year ($365\frac{1}{4}$ days).

61. Sold $131\frac{1}{4}$ bu. of wheat, which was $\frac{7}{15}$ of what I had remaining. What was the entire crop worth, at $83\frac{1}{3}$ cts. a bushel?

62. $$\frac{3\frac{2}{5}+3\frac{4}{15}}{9\frac{7}{12}-4\frac{5}{6}}\times\frac{12\frac{2}{5}-4\frac{9}{10}}{2\frac{3}{8}+3\frac{11}{24}}\div\frac{2\frac{2}{7}\times 1\frac{9}{16}}{47\frac{1}{2}\div 6\frac{1}{4}}=\text{what?}$$

63. Find the total cost of excavating a cellar 45 ft. 4 in. long, 23 ft. 3 in. wide, and 7 ft. 6 in. deep, at $\$1\frac{18}{25}$ a cubic yard, and of walling the sides with limestone $2\frac{1}{4}$ ft. thick, at $\$4\frac{2}{5}$ a perch. (*Masons' measure.*)

NOTE.—*Stonemasons measure from corner to corner around the foundation.*

64. A stock-dealer sold 128 sheep at $\$3\frac{4}{5}$ apiece, and invested $\frac{9}{16}$ of the money in hogs at $\$5\frac{7}{10}$ each. How many hogs did he buy?

65. If a lot $51\frac{1}{5}$ rods long and $32\frac{1}{2}$ rods wide produce $87\frac{1}{2}$ bu. of potatoes to the acre, what would be the value of the crop at $\$\frac{3}{4}$ a bushel?

66. Multiply the sum of $18\frac{3}{4}$ and $11\frac{9}{20}$ by their difference, and divide the product by $5\frac{21}{25}$.

67. I lent A $\frac{3}{40}$ of my money, and B $\frac{2}{9}$ of the remainder. If B received $\$262\frac{1}{2}$ less than A, how much money had I left?

68. Owning a certain quantity of land, I sold $\frac{12}{35}$ of it for $\$2247\frac{3}{4}$, at $\$56\frac{1}{4}$ an acre. How many acres did I own at first?

69. The fencing of a field whose area is $2032\frac{3}{4}$ sq. rods cost $\$149\frac{9}{25}$. If the field is in the form of a rectangle, $34\frac{3}{5}$ rods wide, what was the cost per rod?

70. Two ships start from the same point and sail in opposite directions, one at the rate of $11\frac{11}{12}$ miles per hour, the other at the rate of $13\frac{14}{15}$ miles per hour. How far apart will they be at the end of $12\frac{1}{2}$ hrs.?

71. Two boys, C and D, picked a lot of berries, for which they received $\$11\frac{9}{10}$. C worked $3\frac{1}{3}$ days, and picked $12\frac{1}{2}$ bu. D worked as many days as C picked bushels per day. What amount did each receive?

72. A owes B $\$64\frac{4}{5}$, which is $2\frac{4}{7}$ of what he owes C, or $1\frac{4}{5}$ of what he owes D. How much does he owe altogether?

73. What would be the cost of 15 gal. 3 qts. 1 gill of brandy, at $\$3.84$ per gallon?

74. Paid $\$64\frac{3}{5}$ per acre for a farm, and then sold $\frac{11}{25}$ of it at cost, for $\$1776\frac{1}{2}$. How many acres were there in the entire farm?

75. A speculator bought $\frac{25}{32}$ of a cargo of wheat.

He sold $\frac{3}{5}\frac{3}{0}$ of his share to one man, and the remainder, which was $1195\frac{5}{16}$ bu., to another. How many bushels did the cargo contain?

76. The circumference of the fore wheel of a wagon is $10\frac{1}{8}$ ft., of the hind wheel, $12\frac{3}{4}$ ft. How many more revolutions will the former make than the latter in going a distance of $5\frac{1}{8}\frac{9}{8}$ miles?

77. Two cities, A and B, are situated upon the same stream. A steamer leaves A for B, sailing at the rate of $9\frac{7}{10}$ miles per hour, while another leaves B for A, sailing at the rate of $8\frac{3}{4}$ miles per hour. If they meet in $24\frac{8}{9}$ hrs., what is the distance from A to B?

78. A cattle-dealer paid $\$327\frac{3}{5}$ for sheep, at $\$3\frac{3}{5}$ apiece. But 7 having died, at what price per head must he sell the remainder to sustain no loss?

79. A granite base for a monument is 3 ft. 9 in. square and 1 ft. 4 in. high. Find its value, at $\$6\frac{3}{5}$ a cubic foot.

80. A speculator bought a lot of hardware for $\frac{1}{1}\frac{9}{6}$ of its value, and sold it for $\frac{1}{1}\frac{1}{2}$ of its value, thereby losing $\$32\frac{1}{2}$. How much did he *pay* for it?

81. A merchant paid $\$247\frac{1}{2}$ for apples, at $\$2\frac{1}{2}\frac{6}{5}$ a barrel, and sold $\frac{8}{1}\frac{}{5}$ of them at a profit of $\$\frac{9}{2}\frac{}{5}$ per barrel. How much did he receive for what he sold?

82. A pasture is $49\frac{1}{2}$ rods long, and rectangular in form, with an area of $13\frac{4}{8}\frac{9}{0}$ acres. It is surrounded by a fence 5 boards high, each board being 6 in. in width. What was the cost of the lumber at $\$1\frac{3}{5}$ per hundred feet?

83. Six loads of hay weighed $8\frac{1}{2}$ tons. The first five weighed respectively $1\frac{2}{5}$ tons, $1\frac{3}{1}\frac{}{0}$ tons, $1\frac{1}{2}\frac{3}{0}$ tons, $1\frac{1}{2}\frac{2}{5}$ tons, and $1\frac{2}{5}\frac{1}{0}$ tons. What was the weight of the sixth load?

84. On counting their money, it was found that B's money was $\frac{2}{1}\frac{3}{6}$ of A's, and that C had $\frac{1}{2}\frac{2}{5}$ as much as both

of the others. If C had $6\frac{4}{5}$ more than A, how much had B?

85. If one edge of a cubical block of granite is 2 ft. 3 in. in length, what would be the cost of polishing five of its faces, at $\$1\frac{7}{25}$ a square foot?

86. A man can do a piece of work in $12\frac{3}{8}$ days. If his son works $\frac{1}{1}\frac{1}{6}$ as fast, how long would it take both to complete the work?

87. A earns $27\frac{1}{2}$ cts. an hour, and B $16\frac{1}{4}$ cts. How much will both have earned when B has earned $\$12\frac{12}{25}$?

88. How many yards of cloth, at $\$1\frac{7}{8}$ per yard, must be given for 8 bu. 2 pks. 5 qts. 1 pt. plums, at $\$2\frac{2}{5}$ a bushel?

89. What was the cost of $37\frac{1}{2}$ acres of woodland, if $\$67\frac{1}{2}$ was lost by selling $20\frac{1}{4}$ acres for $\$1282\frac{1}{2}$?

90. A can do a piece of work in $4\frac{4}{5}$ days; B, a piece $3\frac{3}{4}$ times as large in $16\frac{2}{3}$ days; C, a piece $3\frac{1}{3}$ times as large as A's in $12\frac{1}{2}$ days. In what time, by working together, can they do a piece $8\frac{3}{4}$ times as large as the first?

91. A jeweler paid $\$195\frac{3}{4}$ for gold, at $\$1\frac{1}{5}$ a pennyweight, and made it into rings weighing $3\frac{5}{8}$ pwt. each. If he sold the rings at $\$5\frac{1}{2}$ apiece, what was his gain?

92. A owns $82\frac{3}{16}$ acres of land, B $11\frac{9}{40}$ acres less, C owns $74\frac{9}{80}$ acres less than A and B combined. How many acres have B and C together?

93. A man divided $\frac{5}{8}$ of his farm between his two sons, giving to the younger $\frac{7}{9}$ as much as to the elder. If the elder received $12\frac{1}{2}$ acres more than the other, how many acres were there in the entire farm?

94. A travels $187\frac{1}{2}$ miles in $5\frac{5}{8}$ days, B $206\frac{1}{4}$ miles in $6\frac{3}{5}$ days. How far apart will they be at the end of 12 days, if they travel in the same direction? If they travel in opposite directions?

95. Two cities are situated upon the same road, 500 miles apart. An express train running at the rate of $41\frac{2}{3}$

miles an hour, and a freight traveling $18\frac{3}{4}$ miles an hour, start at the same time from one city to the other. How far from the latter will the freight be when the express arrives?

96. A owned $\frac{5}{6}$ of a factory, and sold $\frac{3}{4}$ of his share to B, who sold $\frac{1}{2}$ of his share to C, who sold $\frac{2}{3}$ of what he bought to D. What part of the factory did each then own?

97. If my money be multiplied by $\frac{14}{15}$, and $\$\frac{3}{5}$ be added to the product, and $\$\frac{24}{25}$ be subtracted from the sum, and the remainder divided by $\frac{43}{50}$, the result will be $24. How much money have I?

98. Divide the product of $\frac{6\frac{5}{12}}{6\frac{1}{9}}$ and $\frac{10\frac{2}{3}}{12\frac{4}{5}}$ by the quotient of $\frac{7\frac{7}{8}}{15\frac{3}{10}}$ divided by $\frac{11\frac{2}{3}}{6\frac{3}{8}}$

99. C and D dug a ditch for $\$20\frac{1}{4}$; C worked $4\frac{1}{2}$ days and dug $16\frac{1}{5}$ rods; D worked as many days as C dug rods per day. What did each receive?

100. A merchant charged $\$82\frac{1}{2}$ for flour, at $\$4\frac{2}{5}$ a barrel, which was $\frac{11}{2}$ of what he received for what he had remaining, at $\$4\frac{4}{5}$ a barrel. How many barrels did he sell altogether?

101. Out of a shipment of merchandise valued at $\$2604\frac{4}{5}$, $\frac{1}{4}$ was destroyed by fire, $\frac{2}{11}$ of the remainder was thrown overboard, and the balance, being damaged, was sold for $\frac{5}{8}$ of its value. What was received for it?

102. A lodge-room is 48 ft. 9 in. long, 37 ft. 6 in. wide, and 18 ft. high. It is to be plastered at $\$\frac{6}{25}$ a square yard, and the floor is to be covered with Brussels carpet ($\frac{3}{4}$ yd. wide), at $\$1\frac{1}{5}$ a yard. What is the entire bill?

# DECIMAL FRACTIONS.

ARTICLE 135.

## Writing Decimals.

*Write the following Decimal Numbers:*

1. Nine *hundredths.*
2. 907 *thousandths.*
3. Twenty-eight *thousandths.*
4. Eleven *thousandths.*
5. Thirty-five *ten-thousandths.*
6. Seven hundred and twenty-one *ten-thousandths.*
7. Six *ten-thousandths.*
8. 5431 *ten-thousandths.*
9. 8643 *hundred-thousandths.*
10. Seven *hundred-thousandths.*
11. Fifty-six *hundred-thousandths.*
12. Four hundred and seven *hundred-thousandths.*
13. 17943 *hundred-thousandths.*
14. Twenty thousand and two *hundred-thousandths.*
15. Nineteen *millionths.*
16. Seven thousand and one *millionths.*
17. Three *millionths.*
18. Eight hundred and five *millionths.*
19. 13946 *millionths.*
20. 187625 *millionths.*
21. Sixty-nine thousand and eleven *millionths.*
22. One hundred thousand one hundred and one *millionths.*
23. 967008 *ten-millionths.*
24. Seventy-five *ten-millionths.*
25. Eighty-one thousand and seven *ten-millionths.*

26. One thousand and one *ten-millionths.*
27. Three hundred and forty-nine *ten-millionths.*
28. 3456789 *ten-millionths.*
29. Eighty-six thousand *ten-millionths.*
30. Ten million ten thousand and one *hundred-millionths.*
31. 7500075 *hundred-millionths.*
32. 500005 *hundred-millionths.*
33. 68432729 *billionths.*
34. Five hundred and sixty-five *hundredths.*
35. Ten thousand two hundred and six *thousandths*
36. 14627 *ten-thousandths.*
37. 156983 *hundred-thousandths.*
38. 4091725 *millionths.*
39. 89625437 *ten-millionths.*
40. 123456789 *hundred-millionths.*
41. Sixty units and six *hundredths.*
42. Four hundred units and four *thousandths.*
43. 1501 units and 1501 *hundred-thousandths.*
44. 10001 units and 10001 *millionths.*
45. Seventy-seven units and 707 *ten-millionths.*
46. 1010001 *billionths.*
47. 37425651 *billionths.*
48. 1700171 *ten-billionths.*
49. 87625 *hundred-billionths.*
50. 1001001 units and 1001 *millionths.*

## ARTICLE 136.

## Reading Decimals.

*Read the following Decimal Numbers:*

1. .13; .024; .639; .007; 4.5.
2. 5.06; 10.92; 11.101; 12.004; 13.625.
3. .0121; .0015; .1864; .0009; 4.0105.

4. 14.0046; 15.0157; 16.2125; 17.0006; 18.1001.

5. .00137; .06184; .00043; .16187; .00005.

6. 19.10101; 20.00364; 25.00059; 29.08125; 30.00303.

7. .000751; .010604; .169438; .016702; .002002.

8. 32.123456; 37.077007; 39.000025; 40.000404; 45.010101.

9. .7184921; .0436425; .0017894; .0006103; .1001001.

10. .123456789; .021012021; .303033003; .006912027; .010100101.

11. 50.005; 55.0625; 57.31; 59.9; 60.03125.

12. 62.0043; 63.98725; 66.00092; 69.999; 70.000007.

13. 75.0862; 80.18625; 85.191919; 90.0990099; 95.-100101001.

14. 100.00001; 101.0101; 100.10101; 101.1011011; 100.1001001.

15. 1000.0001; 2000.20202; 3000.300303; 4000.4000-404; 5000.050005055.

16. .681927345; .0086400901; .102103104105; 1001.-10011001001; 12345.1234512345.

17. .20; .3100; .4210; .53100; .641200.

18. .7625100; .06139000; .1284930000; .008642100-000; .098765432100.

## Article 141.—Case III.

### Reduction of Decimals.

*Reduce the following to common fractions or mixed numbers:*

| | | | | | |
|---|---|---|---|---|---|
| 1. | .98 | 7. | .0125 | 13. | .01875 |
| 2. | .32 | 8. | .5625 | 14. | .15625 |
| 3. | .064 | 9. | .9875 | 15. | .23125 |
| 4. | .325 | 10. | .0025 | 16. | .96875 |
| 5. | .675 | 11. | .0256 | 17. | .009375 |
| 6. | .008 | 12. | .00875 | 18. | .234375 |

| | | | | | |
|---|---|---|---|---|---|
| 19. | .000375 | 24. | 7.625 | 28. | 15.00375 |
| 20. | .078125 | 25. | 9.032 | 29. | 17.06875 |
| 21. | 1.2 | 26. | 11.0875 | 30. | 19.028125 |
| 22. | 3.75 | 27. | 13.3125 | 31. | 21.390625 |
| 23. | 5.45 | | | | |

## ARTICLE 142.—CASE IV.

### Reduction of Decimals.

*Reduce the following to Decimals:*

| | | | | | |
|---|---|---|---|---|---|
| 1. | $\frac{13}{20}$ | 11. | $\frac{148}{625}$ | 21. | $\frac{49}{25}$ |
| 2. | $\frac{19}{25}$ | 12. | $\frac{193}{1250}$ | 22. | $\frac{121}{80}$ |
| 3. | $\frac{47}{50}$ | 13. | $\frac{49}{160}$ | 23. | $\frac{31}{16}$ |
| 4. | $\frac{21}{40}$ | 14. | $\frac{28}{82}$ | 24. | $\frac{49}{82}$ |
| 5. | $\frac{7}{8}$ | 15. | $\frac{27}{64}$ | 25. | $\frac{125}{64}$ |
| 6. | $\frac{98}{250}$ | 16. | $\frac{169}{320}$ | 26. | $\frac{1}{18}$ |
| 7. | $\frac{847}{1000}$ | 17. | $\frac{25}{128}$ | 27. | $\frac{34}{85}$ |
| 8. | $\frac{53}{80}$ | 18. | $\frac{77}{640}$ | 28. | $\frac{93}{175}$ |
| 9. | $\frac{437}{500}$ | 19. | $\frac{225}{256}$ | 29. | $\frac{239}{240}$ |
| 10. | $\frac{13}{16}$ | 20. | $\frac{55}{512}$ | 30. | $\frac{13}{510}$ |

## ARTICLE 143.

### Addition of Decimals.

1. Add 1.1; 2.22; 3.333; 4.4444.

2. .3 + .05 + .017 + .2639 + .15625 + .212849 = what?

3. Find the sum of 12.25; 21.9; 32.015; 45.0019; 50.05; 89.0336.

4. Add 9 and 34 *thousandths;* 17 and 51 *hundredths;* 18 and 6843 *ten-thousandths;* 23 and 39269 *hundred-thousandths;* 31 and .37901.

5. .3 + 1.04 + 2.005 + 3.0006 + 4.00007 + 2.000008 + .0000009 = what?

6. Find the sum of 1 and 8 *tenths;* 2 and 85 *hun-*

*dredths;* 3 and 247 *thousandths;* 4 and 5618 *ten-thousandths;* 5 and 93612 *hundred-thousandths;* and 6 and 605080 *millionths.*

7. Add 8.003; 10.1; 21.000011; 32.0006; 40.0075001.

8. 15.08 + 133.375 + 147.4785 + 125.16437 + 272.902132 + 161.1234567 + 100.76543201 + 44.11110929 = what?

9. Find the sum of 11 *tenths;* 222 *hundredths;* 3333 *thousandths;* 44444 *ten-thousandths;* 555555 *hundred-thousandths;* 6666666 *millionths;* 77777777 *ten-millionths;* 888888888 *hundred-millionths;* 9999999999 *billionths.*

10. Reduce to mixed decimals and add $7\frac{1}{2} + 8\frac{3}{4} + 9\frac{4}{5} + 10\frac{7}{8} + 11\frac{9}{10} + 12\frac{15}{16} + 13\frac{19}{20} + 14\frac{24}{25} + 15\frac{31}{32}$.

11. A tract of land was subdivided into lots as follows: 10.1 acres; 15.25 acres; 20.175 acres; 32.2625 acres; 40.08375 acres; and 42.12875 acres. How many acres were there in the entire tract?

12. Six ingots of gold weighed as follows; 4.1875 lb.; 4.15625 lb.; 4.1475 lb.; 4.1625 lb.; 4.2225 lb.; 4.12375 lb. What was the entire weight?

13. A druggist compounded the following into three-grain pills: 1.225 $\overline{3}$; 1.375 $\overline{3}$; 1.125 $\overline{3}$; 1.625 $\overline{3}$; 1.275 $\overline{3}$; 1.375 $\overline{3}$. If he sold the pills at $2\frac{1}{2}$ cts. each, what did he receive for them?

14. A steamer crossing the Atlantic in $7\frac{1}{2}$ days, registered the following distances: 465.16 miles; 431.928 miles; 446.7275 miles; 429.15845 miles; 455.187625 miles; 456.315 miles; 440.21875 miles; 225.304675 miles. How far did she sail?

15. Eight loads of wood measured respectively 1.0625 cords; 1.1375 cords; 1.1625 cords; 1.15625 cords; 1.125 cords; 1.10875 cords; 1.175 cords; 1.0725 cords. If it was sold at $4.75 a cord, what was received for it?

16. A gold-miner's monthly gatherings for seven

months were as follows; 20.125 oz.; 25.1675 oz.; 22.4375 oz. · 24.8075 oz.; 23.1225 oz.; 19.3375 oz.; and 15.0025 oz. It was sold at the mint for $19.20 an ounce. What did he receive for it?

17. On a tax duplicate for a certain year, eight citizens were charged the following amounts of tax: A, $12.52932; B, $18.62724; C, $20.58048; D, $23.77236; E, $25.6065; F, $28.32198; G, $29.775; and H, $19.43712. What was the amount of tax charged to them?

18. Nine farmers raised the following crops of corn: 1031.15625 bu.; 1103.18375 bu.; 1027.16125 bu.; 1100.00625 bu.; 1172.01875 bu.; 1205.03125 bu.; 1134.4425 bu.; 1175.43625 bu.; and 1051.56375 bu. They sold it to a speculator for 64 cts. a bushel. What amount did he pay for the corn?

19. The monthly product of an Anthracite Coal Co. for seven months was as follows: 986.42525 tons; 1029.347 tons; 1056.3985 tons; 1181.73 tons; 964.81275 tons; 1178.9 tons; and 1102.3865 tons. What was the entire product?

20. The floors of a house containing eight rooms measured respectively $302\frac{1}{2}$ sq. ft.; $289\frac{3}{4}$ sq. ft.; $275\frac{2}{5}$ sq. ft.; $210\frac{5}{8}$ sq. ft.; $196\frac{9}{10}$ sq. ft.; $185\frac{9}{16}$ sq. ft.; $176\frac{23}{40}$ sq. ft.; and 162.6875 square feet. How many square yards of carpeting are required?

## ARTICLE 144.

### Subtraction of Decimals.

1. From 137.34 take 49.27.
2. From 200.456 take 169.58.
3. From 923.16 take 725.286.
4. From 1001 and 1 *thousandth* take 101 and 1 *hundredth*.

5. From 1300 and 13 *ten-thousandths* take 130 and 13 *hundredths*.

6. Take 99.26854 from 100

7. Subtract 101 *thousandths* from 101000.

8. Subtract 9876.54321 from 12345.6789.

9. Take 101010.101101 from 1010001.010001.

10. Find the difference between 63 *tenths* and 63 *hundredths*.

11. Find the difference between 39265 *millionths* and 18937 *hundred-thousandths*.

12. Find the difference between 311211 *millionths* and 311211 *ten-millionths*.

13. From 1000 and 1 *ten-thousandth* take 100 and 1 *hundredth*.

14. Subtract 7500.075 from 75000 and 75 *millionths*.

15. Subtract the difference between 343.372914 and 257.0218 from their sum.

16. $513.8492625 - (17.51634 + 201.958641) =$ what?

17. $7362.043 - (6685.6378 - 3314.15925) =$ what?

18. $56724.18391 - (32659.0134 + 23065.17051) =$ what?

19. $.15625 - (.156245 - .000995) =$ what?

20. $3.396427 - 1.058269 - 1.608503 + .270345 =$ what?

21. A travels 247.13225 miles, and B 83.046 miles in the same direction. How far apart are they then?

22. The sum of two numbers is 1001.15; the greater is 501.08326. What is the less number?

23. The difference of two numbers is 101.01; the greater is 1111.111. What is the less number?

24. The greater of two numbers is 53.85275, and their difference is 7.7055. What is the sum of the numbers?

25. A lady purchased some dress-goods for \$24.0625, trimmings for \$8.1666$\frac{2}{3}$, a shawl for \$12.1875, ribbon for \$2.3333$\frac{1}{3}$, and gloves for \$1.35. She handed the clerk a

fifty-dollar bill, and received $1.75 change. How much was this incorrect?

26. A pedestrian traveled 200 miles in four days. The first day he went 56.17625 miles; the second, 53.14 miles; the third, 41.0125 miles. How far did he travel the fourth day?

27. A raised 1095.187625 bu. oats; B, 293.0223 bu. less than A; C raised 794.7059 bu. less than A and B combined. What was the entire amount raised?

28. A's farm contains 85.14375 acres, which is 13.2412 acres more than B's; C's contains 64.0926 acres less than A's and B's together. What is the value of the three farms, at $100 per acre?

29. A dug 17.83 oz. of gold, which was 3.05625 oz. less than B dug; C dug 13.4325 oz. less than both of the others. What was the value of all of the gold that was dug, at $20 per oz.?

30. There are three numbers, of which the second is 293.8125 less than the first, and the third is 356.4375 less than the second. If the sum of the three is 2055.9375, what is the first number?

## ARTICLE 147.

### Multiplication of Decimals.

*Multiply*

1. 137.3 by .27.
2. .473 by 37.5.
3. 9.125 by 96.
4. 18.625 by 4.72.
5. 875 by .0256.
6. 156.25 by .4096.
7. 2.025 by .0576.
8. .06875 by 62.4.

9. .0128 by 78.125.

10. 9375.0625 by 3.2768.

11. 175 and 64 ten-thousandths $\times$ 18 and 125 thousandths = ?

12. 81 and 28 hundredths $\times$ 75 and 625 ten-thousandths = ?

13. 25 thousand $\times$ 25 thousandths = ?

14. 225 and 1875 hundred-thousandths $\times$ 3 and 24 hundredths = ?

15. 144 tenths $\times$ 875 hundredths = ?

16. $56\frac{1}{4}$ times $51\frac{1}{5}$ equals what?

17. $64\frac{7}{8}$ times $1\frac{5}{6}$ equals what?

18. $1876\frac{9}{16}$ times $40\frac{24}{25}$ equals what?

19. $20\frac{12}{25}$ times $4\frac{7}{8}$ equals what?

20. 97.65625 times $1\frac{8}{125}$ equals what?

21. Bought 81.92 acres of land at $46.875 per acre. What did I pay for it?

22. If an express train run 51.875 miles per hour, how far can it run in 8.64 hrs.?

23. Find the cost of 48.9375 gal. of wine, at $2.56 per gallon.

24. A farm of 31.25 acres produced 66.4 bu. of potatoes to the acre. If the entire crop was sold at $.56 per bushel, what was received for it?

25. Bought 32 bls. of molasses, each containing 43.75 gal., at $.625 per gallon, and sold it for 1.2 times the cost. What was the selling price?

26. A pile of wood is 63.75 ft. long 8 ft. wide, and 9.6 ft. high. What is its value, at $4.80 a cord?

27. A field is 84.48 rods long and 56.25 rods wide. Find its value, at $66\frac{2}{3}$ per acre.

28. Find the cost of excavating a cellar 37.5 ft. long, 29.25 ft. wide, and 6.4 ft. deep, at $.225 a cubic yard.

29. Two vessels start from the same point, and sail

in opposite directions, one at the rate of 15.324 miles per hour, the other at the rate of 17.316 miles per hour. How far apart will they be at the end of 15.625 hrs.?

30. A, B, and C bought 3276.8 bu. of corn, of which A took .1875, B .4375, and C the remainder. What was C's share?

31. A clerk earned .4 of .64 of $312.5 a month for 10.5 mo., and saved .625 of it. How much did he save?

32. A speculator bought 4096 bu. of wheat, at $1.25 a bushel. He sold .25 of it at $1.375 a bushel, .4375 of it at $1.5 a bushel, and the remainder at $1.55 a bushel. What was his gain on the transaction?

33. A grocer bought 46.875 bu. of apples, at $.88 per bushel, but was obliged to sell .75 of them for .64 of their cost. How much did he receive for what he sold?

34. A owning 345.6 acres of prairie land, sold .6875 of it to B, who sold .625 of his share to C, who sold .64 of what he bought to D, who disposed of his part at $12.5 an acre. What did he get for it?

35. A church is 85.64 ft. long, 51.28 ft. wide, and 31.5 ft. high to the eaves. Find the cost of painting the outside walls, at $.25 a square yard.

### Article 150.

### Division of Decimals.

*Divide*

1. 696.6 by 4.3.
2. 190.28 by 6.7.
3. 262.044 by 15.06.
4. 1312.5 by 150.
5. 105.41 by 103.75.
6. .00975 by .0625.
7. 2.9565 by 91.25.

8. 12.05 by .625.
9. 270 by 1.875.
10. 98.4375 by 437.5.
11. 16.625 by 1.064.
12. 192 by .1024.
13. 2.432 by 47.5.
14. Divide 5 hundredths by 16 hundredths.
15. Divide 316 thousandths by 9 and 875 thousandths.
16. Divide 1 by 64 hundredths.
17. Divide 27 and 2 tenths by 10 and 625 thousandths.
18. Divide 832 tenths by 512 hundredths.
19. Divide 10 by 128 millionths.
20. $1.6 \div 6.25 \div .1024 =$ what?
21. $150\frac{3}{20} \div 4\frac{1}{8} =$ what?
22. Paid $720 for land, at $37.5 per acre. How many acres did I buy?
23. In what time can a locomotive run 293.7 miles, at the rate of 35.6 miles per hour?
24. A mechanic earned $45 in 16 days of nine hours each. How much was that per hour?
25. Bought a lot of flour for $712.8, and sold a part of it at cost for $490.05. What decimal part of the entire quantity was sold?
26. If a race-track is 1796.875 yds. in length, how long would it require a horse, going at the rate of 11.5 yds. per second to trot around it?
27. Having a quantity of wood, I sold .332 of it for $199.20, at $4.8 a cord. How many cords had I at first?
28. If 8.75 tons of anthracite coal cost $44.8, how many tons could be bought for $21.76?
29. Paid $126 for apples at $2.625 a barrel, and sold .5625 of them for $85.05. At what price per barrel were they sold?
30. A farmer paid $3096 for land, at $96 an acre. If

the farm was 82.56 rods long, and rectangular in form, what was its width?

31. Sold .275 of a cask of wine for $30.80, which was at the rate of $1.75 a gallon. How many gallons did the cask contain?

32. A man walked 230 miles in eight days. At the same rate how long would it take him to walk 310.5 miles?

33. If 19.2 bu. of wheat are worth 43.2 bu. of corn, how many bushels of wheat should be given in exchange for 99.9 bu. of corn?

34. A is 12.6 miles ahead of B, and travels 3.15 miles per hour, which is .75 of B's rate of traveling. In how many hours will B overtake A?

35. I lent A .36 of my money, and B .75 of the remainder. If B received $300 more than A, how much money had I at first?

36. A man owning .88 of a tract of land, sold .375 of his share for $2475. At that rate, what was his remaining interest worth?

37. Express decimally $\frac{4\frac{1}{2}}{6\frac{2}{5}}$ and $\frac{9\frac{3}{8}}{16\frac{2}{3}}$ and divide the former by the latter.

## DECIMAL COMPOUND NUMBERS.

### ARTICLE 151.

### Reduction to Lower Denominations.

1. Reduce .00625 bu. to the decimal of a pint.
2. Reduce .015625 gal. to the decimal of a gill.
3. Reduce .000375 cwt. to the decimal of an ounce.
4. Reduce .000125 mile to the decimal of a foot.
5. Reduce .000005 acre to the decimal of a sq. ft.

6. Reduce .000625 cord to the decimal of a cu. ft.

7. Reduce .000015 week to the decimal of a minute.

8. Reduce .000025 lb. Troy to the decimal of a gr.

9. Reduce .000875 lb. Apothecary to the decimal of a scruple.

10. Reduce .000375 sq. yd. to the decimal of a square inch.

11. Reduce .0000075 day to the decimal of a second.

12. Reduce .000625 hhd. to the decimal of a pint.

13. Reduce .000195 ton to the decimal of a pound.

14. Reduce .001875 bushel to the decimal of a pint.

15. Reduce .00005 year to the decimal of an hour.

16. Reduce .00000625 sq. mile to the decimal of a square rod.

17. Reduce .00015 lb. Troy to the decimal of a grain.

18. Reduce .00015 mile to the decimal of a foot.

19. Reduce .0000025 day to the decimal of a second.

20. Reduce .00000390625 cord to the decimal of a cubic inch.

## ARTICLE 152.

### Reduction of Decimals to Integers.

*Find the value of the following in integers :*

| | | | |
|---|---|---|---|
| 1. | .828125 bu. | 11. | .609375 bu. |
| 2. | .65625 gal. | 12. | .96875 gal. |
| 3. | .5053125 ton. | 13. | .55584375 ton. |
| 4. | .1265625 mile. | 14. | .5859375 mile. |
| 5. | .0975 acre. | 15. | .585 acre. |
| 6. | .01171875 cord. | 16. | .03515625 cord. |
| 7. | .91125 week. | 17. | .759375 week. |
| 8. | .390625 lb. Troy. | 18. | .1171875 lb. Troy. |
| 9. | .871875 lb. Apoth. | 19. | .240625 lb. Apoth. |
| 10. | .1225 yr. | 20. | .18375 yr. |

## Article 153.

### Reduction to Higher Denominations.

1. Reduce .56 pt. to the decimal of a bushel.
2. Reduce .68 gill to the decimal of a gallon.
3. Reduce .8 oz. to the decimal of a ton.
4. Reduce .825 ft. to the decimal of a mile.
5. Reduce .8712 sq. ft. to the decimal of an acre.
6. Reduce 5.44 cu. ft. to the decimal of a cord.
7. Reduce .756 min. to the decimal of a week.
8. Reduce 1.5 pwt. to the decimal of a pound, Troy.
9. Reduce .9 grs. to the decimal of an ounce, Apoth.
10. Reduce .9072 pt. of wine to the decimal of a barrel.
11. What decimal of a bushel is 3 pks. 2 qts. 1 pt?
12. What decimal of a gallon is 3 qts. 1 pt. 1 gill?
13. What decimal of a ton is 1 cwt. 77 lb. 8 oz?
14. Reduce 7 gal. 3 qts. 1 pt. to the decimal of a hogshead.
15. Reduce 4 days 17 hrs. 24 min. to the decimal of a week.
16. Reduce 3 oz. 7 pwt. 12 gr. to the decimal of a pound, Troy.
17. Reduce 5 rods 1.1 yds. to the decimal of a mile.
18. Reduce 78 acres 64 sq. rods to the decimal of a square mile.
19. Reduce 5 ℥ 5 ʒ 1 ℈ 16 gr. to the decimal of a pound, Apoth.
20. Reduce 200 days 21 hrs. 18 min. to the decimal of a year.

## Article 154.

### Miscellaneous Problems in Decimals.

1. Reduce to mixed decimals and add: $3\frac{2}{5}$, $4\frac{5}{8}$, $5\frac{3}{4}$, $6\frac{7}{16}$.

2. Reduce .15625 to a common fraction, and $\frac{1}{6}\frac{5}{4}$ to a decimal fraction.

3. What is the difference between 625 *ten-thousandths* and 5 *tenths?*

4. Find the quotient of 5261.625 divided by 1.4031.

5. Express decimally $\frac{7\frac{1}{2}}{8\frac{8}{9}}$ and $\frac{6\frac{1}{4}}{16\frac{2}{3}}$, and divide the former by the latter.

6. Bought 16925 ft. of lumber, at $14.40 per thousand; 9750 lath, at 24 cts. per hundred; and 7440 lb. of hay, at $10.50 per ton. What was the entire bill?

7. Multiply $\frac{4}{5}$ of .035 by $4\frac{1}{6}$ times 8.4.

8. Reduce .00037 of a hogshead to the decimal of a gill.

9. Reduce .6 pt. to the decimal of a bushel.

10. Find the value in integers of .034 year (365.25 days).

11. What would be the cost of 1 lb. 3 oz. 9 pwt. of gold, at $220 a pound?

†12. $37\frac{1}{2} \times .7 \times 6\frac{1}{4} = ?$

13. Reduce 2 qts. 1 pt. 3 gills to the decimal of a gallon.

14. .7 week + .7 day + .7 hrs + .7 min. = what?

15. Multiply the sum of .07 and .032 by their difference, and divide the product by .0456.

16. Add $.3\frac{1}{8}$, $.04\frac{1}{6}$, $.005\frac{1}{9}$, $.0006\frac{1}{2}$, $1.00000\frac{8}{9}$.

17. Reduce .34375 to a common fraction, and $\frac{2}{6}\frac{7}{4}$ to a decimal fraction.

18. What is the difference between 937 *ten-thousandths* and four *tenths?*

19. 15419.2 ÷ 3.68 = what?

20. Express decimally $\frac{7\frac{1}{2}}{8\frac{1}{3}}$ and $\frac{8\frac{3}{4}}{7\frac{7}{9}}$, and divide the former by the latter.

21. Find the total cost of 16250 ft. of lumber, at $16.40 per thousand, 7860 lath, at 15 cts. per hundred, and 11280 lb. of hay, at $12.50 per ton.

22. Multiply $\frac{5}{8}$ of .032 by $8\frac{1}{3}$ times 7.2.

23. Reduce .000625 lb. Apoth. to grains.

24. Reduce .9 gr. Troy to the decimal of a pound.

25. Find the value in integers of .84 of a week.

26. Reduce 3 pks. 5 qts. 1 pt. to the decimal of a bushel.

27. Divide the sum of .1639 and .0389 by their difference, and multiply the quotient by 6.25.

28. From .0375 hhd. take .5625 gal.

29. What cost 3 lb. 2 ℥ 12 gr. of opium, at $8 per lb.?

30. $1\frac{2}{7} + 2.3\frac{1}{3} + 3.24\frac{1}{4} + 4.515\frac{1}{5} + 5.1666\frac{2}{3} + 6.11\frac{1}{8} + 7.345335\frac{5}{7}$ = what?

31. Reduce $\frac{13}{128}$ to a decimal fraction, and .06875 to a common fraction.

32. What is the quotient of 15784.875 divided by 4.2093?

33. $\frac{9\frac{1}{10}}{87\frac{1}{2}} + \frac{16\frac{2}{3}}{26\frac{2}{3}} - \frac{8\frac{3}{4}}{20}$ reduced to a decimal fraction equals what?

34. Find the total cost of 13250 ft. of lumber, at $11.40 per thousand, 12640 palings, at 65 cts. per hundred, and 9850 lb. of hay, at $8.40 per ton.

35. What is the difference between three *tenths* and four hundred and thirty-five *ten-thousandths?*

36. What decimal of 2 bu. 3 pks. 4 qts. is 1 bu. 3 pks. 1 qt. 1 pt.?

37. Find the value in integers of .03725 sq. mile.

38. Find the cost of 5 bu. 3 pks. 3 qts. 1 pt. of wheat, at $1.28 per bushel.

39. Bought 24980 ft. of lumber, at $1.25 per hundred, 51375 lath, at $1.60 per thousand, and 17480 lb. of hay, at $10.50 per ton. What was the entire bill?

40. What decimal of a week is 4 days 13 hrs. 12 min.?

41. $\frac{50}{106\frac{2}{3}} \times \frac{25\frac{3}{5}}{112} \div \frac{7\frac{13}{16}}{43\frac{3}{4}}$ expressed decimally, equals what?

42. Find the value in integers of .045 year (365.25 days).

43. Reduce 9 oz. 7 pwt. 12 gr. to the decimal of a pound.

44. Multiply $\frac{.045}{.72}$ by $\frac{3.125}{87.5}$ and divide the product by $\frac{28.125}{18.9}$.

45. Find the cost of paving a sidewalk 12.5 ft. wide and 300.75 ft. long, at $4.48 per 100 square feet.

46. The fencing of a field whose area is 1277.145 sq. rods cost $108.675. If the field was in the form of a rectangle, 42.15 rods in length, what was the cost per rod?

47. Two trains are 1548.015 miles apart. They approach each other, one running at the rate of 38.7 miles per hour; the other at the rate of 25.4 miles per hour. In what time will they meet?

48. I invested my money in a farm at $105.6 an acre, and then sold .375 of it at cost for $1980. How many acres were there in the entire tract?

49. If the carpet for a square room, whose side is 15.3 ft. long, cost $39.015, what was the cost per square yard?

50. Two men start together from the same place

and travel in the same direction; one going 39.81 miles per day, the other 20.985 miles per day. How far apart will they be at the end of 9 days?

51. Find the cost of a pile of wood 40 ft. long, 12.8 ft. wide, and 9.5 ft. high, at $4.75 a cord.

52. A man owning .68 of a tract of land, sold .45 of his share for $3901.50. At that rate what was the value of the entire tract?

53. If 8.125 yds. cost $13, what will 11.25 yds. cost?

54. If 16.8 acres of land cost $2310, how many acres can be bought for $3520?

55. If .058 hhds. of wine cost $13.05, what cost 1 hhd?

56. A fruit-dealer paid $24 for strawberries, at $2.56 a bushel. What quantity did he buy?

57. What cost a field 65 rods long and 48 rods wide, at $87.50 per acre?

58. A farmer exchanged 37 bu. 1 pk. 7 qts. of wheat, at $1.60 a bushel, for flour, at $5.50 a barrel. How many barrels did he receive?

59. A man earns $22\frac{1}{2}$ cts. an hour, and a boy earns $8\frac{3}{4}$ cts. How much will both have earned when the boy has earned $5.60?

60. Find the cost of a meadow 52 rods square, at $75 per acre.

61. A's property is worth $4050, which is 1.08 times the value of B's. If C's is .88 of the value of B's, what is the entire value of their property?

62. A laborer agreed to saw a pile of wood 51.2 ft. long, 4 ft. wide, and 5.4 ft. high, for $1.25 a cord. How much did he receive for doing it?

63. A floor is 18.75 ft. long, and 15.3 ft. wide. Find the cost of carpeting it with Brussels carpet (which is .75 yds. wide), at $1.60 a yard.

64. A farmer raised 120 bu. of wheat and 250 bu. of potatoes. He sold the wheat at $1.15 a bushel, and the potatoes at $.625 a bushel. He then bought a team of horses for $150; 40 yds. of cloth, at $1.25 a yard; 5 bls of flour, at $5.50 a barrel; 200 lb. of sugar, at $.075 a pound; 50 lb. of coffee, at 26 cts. a pound; 10 lb. of tea, at 75 cts. a pound; and spent the remainder for bacon, at $12\frac{1}{2}$ cts. a pound. How many pounds of bacon did he buy?

65. Find the cost of a tract of land 66 rods square, at $88 an acre.

66. A man can earn $.3125 while a boy earns $.125. How much will they together have earned when the man has earned $50?

67. B's property is worth $4760, which is 1.12 times the value of C's, and .85 of the value of A's. What is the combined value of A's and C's?

68. From a vessel containing 3585 gal., 65.25 bls. of 31.5 gal. each were drawn off. How many gallons remained?

69. Sold six tracts of land, each containing 42 acres 70 sq. rods, for $63656.25. What was the value per acre?

70. A man can walk 135 miles 144 rods in a week. At the same rate how far could he walk in 23 days?

71. Bought five barrels of molasses, each containing 34 gal. 2 qts. 1 pt., for $95.21875. What was the price per gallon?

72. The circumference of the fore wheel of a wagon is 11.25 ft.; of the hind wheel, 13.5 ft. How many more revolutions will the former make than the latter in going a distance of 4.5 miles?

73. How many times can a box containing 5 bu. 3 pks. 2 qts. be filled from a bin holding 244 bu. 4 qts?

74. A speculator bought 248.64 cords of wood, at

$4.875 a cord. He sold .75 of it at $5.625 a cord, and the remainder at cost. Find his gain.

75. James can walk .06 mile in a minute. In what time can he walk from Cincinnati to Columbus, a distance of 125.28 miles?

76. A druggist bought a cask of wine containing 55 gal. 3 qts. 1 pt., at $1.36 per gallon. He sold .8 of it at $1.50 a gallon, and the remainder at $1.60 a gallon. Find his gain.

77. A man owned .28 of a farm. He sold .25 of his share, and had 78.54 acres left. How many acres had he at first, and how many were there in the entire farm?

78. Explain the effect of removing the cipher in the following: 075, 750, .075, .750.

79. Add eleven *tenths*, 237 *hundredths*, 3617 *thousandths*, 42371 *ten-thousandths*, 596832 *hundred-thousandths*, 6254976 *millionths*, and 14526040 *ten-millionths*.

80. A, B, and C together own 312 sheep. B owns .8 as many as A, and C owns .75 as many as B. What is the number belonging to each?

81. Multiply the sum of 10.1 and 8.65 by their difference, and divide the product by 46.4.

82. On counting their money, it was found that John had 1.25 as much as Henry, and Frank had .7 as much as both of the others. If Frank had $126, how much belonged to John?

83. If a man can walk 195 miles in 8.125 days, how far can he walk in 10.625 days?

84. The rent of my house this year is $204, which is .85 of what I paid last year. The rent last year was .075 of the value of the property. What is the property worth?

85. A steamer started from Pittsburgh to New Orleans, sailing at the rate of 122.5 miles per day. Three

days afterward another steamer followed the first, at the rate of 175 miles per day. At what distance from Pittsburgh was the first overtaken?

86. Find the cost of carpeting a room 18 ft. 9 in. long, 15 ft. 6 in. wide, with Brussels carpet (.75 yd. wide), at $1.80 a yard.

87. If 13.5 bu. of wheat are worth 22.5 bu. of corn, how many bushels of wheat should be given for 217.5 bu. of corn?

88. Bought 160 sheep, at $4.125 each; but 10 having been killed by dogs, at what price per head must I sell the remainder to incur no loss.

89. What decimal of 3 bu. 1 pk. 4 qts. is 1 bu. 1 pk. 1 pt.?

90. .8 gal. + .8 qt. + .8 pt. + .8 gill = what?

91. The slate blackboards for a school building of 12 rooms cost $945, at $.3125 a square foot. How many square yards were required for each room?

92. An assembly-room is 40.5 ft. long, 32.4 ft. wide, and 15.5 ft. high. Find the total cost of painting the walls and ceilings, at $.33$\frac{1}{3}$ a square yard, and of covering the floor with Brussels carpet (.75 yd. wide), at $1.25 a yard.

93. Find the value of a tract of land 64 rods square, at $62.5 per acre.

94. A field is 65 rods long, and contains 21.125 acres. Find the cost of fencing it, at $.93$\frac{1}{3}$ a rod.

95. Reduce to mixed decimals and add: $1\frac{9}{16}$, $2.4\frac{7}{8}$, $3.96\frac{7}{25}$, $4.578\frac{9}{20}$, $5.6293\frac{13}{50}$, and 6.779424.

96. Two vessels sail in opposite directions, one at the rate of 130.3125 miles per day; the other at the rate of 119.625 miles per day. How far apart will they be at the end of 8 days?

97. Multiply the sum of 1.75 and .64 by their difference, and divide the product by .074.

98. If a man can walk 300 miles in 9.375 days, how far at the same rate can he walk in 15.625 days?

99. If a lot 43.2 rods long, and 37.5 rods wide produce 88 bu. of potatoes to the acre, what is the value of the crop at 50 cts. a bushel?

100. A speculator paid $1600 for corn, at $.625 a bushel, and sold .4375 of it for $840. At what price per bushel did it sell?

101. A farmer owning 160 acres of land, sold a part of it for $5400 at $75 an acre. What decimal part of his land did he sell?

102. 65 of my sheep died, which was .26 of what I had remaining. If I paid $3.60 apiece for them, what did the entire flock cost?

103. Smith sold Jones a farm and gained .15 of the cost. Jones sold it to Brown at a gain of .12 on what it cost him. Brown sold it to Robinson for $1449, which was a loss of .1 of what he paid for it. What did the farm cost Smith?

104. At $7.20 a cubic foot, what would be the cost of a granite base 42 in. square, and 18 in. high?

105. A man having a certain distance to travel, went .2 of it the first day, .25 of it the second day, .28 the third day, and the remainder, which was 40.5 miles, on the fourth day. What was the entire distance?

106. A field is 32.4 rods wide, and contains 7 acres 95 sq. rods. Find the cost of fencing it at $83\frac{1}{3}$ cts. a rod.

107. .3 of an orchard are apple trees, .27 are peach trees, .24 are pear trees, and the remainder, which is 38, are plum trees. What is the number of peach trees?

108. The slate blackboards for a school building of 8 rooms cost $748.80, at 32 cts. 5 mills a square foot. How many square yards were required for each room?

109. Find the value of a block of granite 45 in. square and 18 in. high, at $6.40 a cubic foot.

110. A field is 47.5 rods long, and 38.4 rods wide. How many bushels of corn will it produce, allowing 55 bushels to the acre?

111. A speculator bought a 40-acre tract of land for $150 per acre, and subdivided it into lots 10 rods long by 4 rods wide, after allowing .3 of the tract for streets. If the cost of grading was $2500, and the lots were sold at $125 each, what was his gain by the speculation?

112. A lot is 36.8 rods in length, and 27.5 rods in width. If it produces 100 bu. of potatoes to the acre, what would be the value of the crop at 60 cts. per bushel?

113. A's money is .8 of B's, and B's is .75 of C's. If C has $120 more than A, how much has each?

114. A parlor is 18 ft. 9 in. long, 13 ft. 6 in. wide, and 9 ft. high. Find the cost of plastering it at 40 cts. a square yard, and of carpeting the floor with Brussels carpet at $1.10 a yard.

115. A building company bought a quarter-section of land at $125 an acre, and subdivided it into lots 55 ft. front by 165 ft. deep, after allowing .234375 of the tract for streets. The expense of surveying and grading was $10000, and the lots were sold for $100 each. What was the net gain on the transaction?

# PERCENTAGE.

## ARTICLE 163.

*Express the following, both as common and as decimal fractions:*

1. $1\frac{1}{5}$ %
2. $2\frac{1}{4}$ %
3. $3\frac{1}{8}$ %
4. $3\frac{3}{4}$ %
5. $7\frac{1}{2}$ %
6. $7\frac{2}{5}$ %
7. $31\frac{1}{4}$ %
8. $32\frac{1}{2}$ %
9. 38 %
10. $43\frac{3}{4}$ %
11. $68\frac{3}{4}$ %
12. $92\frac{1}{2}$ %
13. $93\frac{3}{4}$ %
14. $112\frac{1}{2}$ %
15. $118\frac{3}{4}$ %
16. $131\frac{1}{4}$ %
17. $137\frac{1}{2}$ %
18. $143\frac{3}{4}$ %
19. $156\frac{1}{4}$ %
20. $162\frac{1}{2}$ %
21. $\frac{3}{8}$ %
22. $\frac{5}{16}$ %
23. $\frac{16}{25}$ %
24. $\frac{39}{40}$ %
25. $\frac{15}{16}$ %
26. .2 %
27. .4 %
28. .5 %
29. .12 %
30. .25 %

## ARTICLE 164.—CASE I.

*Find the following:*

1. 15 % of 640 acres.
2. 27 % of $75.
3. 36 % of 50 cords.
4. 45 % of 1 mile.
5. 55 % of 1 hr.
6. 64 % of 50 cts.
7. 48 % of 175 gal.
8. 77 % of 500 bu.
9. 85 % of 1720 lb.
10. 92 % of 150 horses.
11. 108 % of 25 men.
12. 125 % of $320.
13. 175 % of 668 sheep.
14. $166\frac{2}{3}$ % of 840 tons.
15. 225 % of 996 bls.
16. 348 % of $1025.
17. 524 % of 1250 men.
18. 625 % of 1560 miles.
19. 1000 % of 2000 lb.
20. $888\frac{8}{9}$ % of 9999 bushels.
21. 1250 % of $2400.
22. .2 % of 1750.
23. .3 % of 5.

24. .4 % of 18250.
25. .5 % of 1580.
26. .6 % of 10125.
27. .7 % of .8.
28. .8 % of 15625.
29. .9 % of 450.
30. .1 % of .1.
31. .11 % of 10000.
32. .15 % of 6400.
33. .01 % of 5555.
34. .75 % of $8888\frac{8}{9}$.
35. .875 % of 86400.
36. 3.7 % of 1250.
37. 4.4 % of 875.
38. 7.5 % of 1560.
39. 5.2 % of 37500.
40. 8.25 % of 16800.
41. $3\frac{1}{3}$ % of $18\frac{3}{4}$.
42. $6\frac{1}{4}$ % of $8\frac{8}{9}$.
43. $6\frac{2}{8}$ % of $112\frac{1}{2}$.
44. $7\frac{1}{5}$ % of $87\frac{1}{2}$.
45. $9\frac{1}{11}$ % of $30\frac{1}{4}$.
46. $11\frac{1}{9}$ % of $8\frac{1}{10}$.
47. $18\frac{3}{4}$ % of $25\frac{3}{5}$.
48. $26\frac{2}{3}$ % of $37\frac{1}{2}$.
49. $43\frac{3}{4}$ % of $88\frac{8}{9}$.
50. $83\frac{1}{8}$ % of $109\frac{1}{11}$.
51. $\frac{3}{8}$ % of $33\frac{1}{3}$ gal.
52. $\frac{7}{10}$ % of 5000 acres.
53. $\frac{3}{4}$ % of $1260.
54. $\frac{5}{6}$ % of 16800 men.
55. $\frac{5}{8}$ % of 800 bls.
56. $\frac{10}{33}$ % of 24750 lb.
57. $\frac{9}{16}$ % of 24000 miles.

58. $\frac{1}{2}\frac{2}{5}$ % of $100000.
59. $\frac{1}{4}\frac{1}{0}$ % of 20000 bu.
60. $\frac{5}{1}\frac{}{2}$ % of $1866o.
61. $6\frac{2}{3}$ % of $42o.
62. $9\frac{3}{8}$ % of 55 tons.
63. $11\frac{1}{9}$ % of 13 lb. Troy.
64. $18\frac{3}{4}$ % of 19 bu.
65. $27\frac{3}{4}$ % of 125 gal.
66. $36\frac{4}{5}$ % of 75 lb. Apoth.
67. $45\frac{5}{11}$ % of 1 sq. mile.
68. $55\frac{5}{9}$ % of 5 miles.
69. $65\frac{5}{8}$ % of 37.5 cords.
70. $71\frac{1}{8}$ % of 1 year (365.25 days).

71. A trader having $1960, spent 15 % of it. How much had he left?

72. A speculator having $15625, invested 16 % of it in town lots, 24 % of it in railroad stock, 28 % of it in bank stock, and the remainder in a farm. How much did he pay for the farm?

73. A merchant having $1650, spent $13\frac{1}{3}$ % of it for coffee, at 16 cts. a pound. How many pounds did he buy?

74. A drover bought 175 hogs, at $5.50 each. 12 % of them were stolen; at what price per head must he sell the remainder to incur no loss?

75. Paid $462 for sheep, at $3.85 each. $8\frac{1}{3}$ % having died, at what price per head must I sell the remainder to sustain no loss?

76. A farmer having raised 1980 bu. of corn, sold $41\frac{2}{3}$ % of it at 48 cts. a bushel. How much did he receive for the quantity sold?

77. Owning a farm of 240 acres, I sold $43\frac{3}{4}$ % of it for $7875. What price per acre did I receive?

78. A speculator having $10400 in bank, drew out

$18\frac{3}{4}\%$ of it to purchase wool at 30 cts. a pound. How many pounds did he buy?

79. A commission merchant sold 175 bls. of flour at $4.50 a barrel, and 1680 bu. of wheat at $87\frac{1}{2}$ cts. a bushel. Find his commission, at $3\frac{1}{3}\%$.

80. An agent sold 150 bls. of molasses, each containing 52 gal., at 45 cts. a gallon. What was his commission, at $2\frac{1}{2}\%$?

81. A commission house sold 201 bls. of sugar, of 250 lb. each, at $6\frac{2}{3}$ cts. a pound; 120 hhds. of tobacco, each weighing 450 lb., at $22\frac{1}{2}$ cts. a pound; and 175 bales of cotton, of 320 lb. each, at $31\frac{1}{4}$ cts. a pound. Find entire commission, at $1\frac{3}{4}\%$.

82. Paid $3600 for horses, at $75 apiece; $6\frac{1}{4}\%$ were lost in crossing a river. At what price per head must I sell the remainder to realize a clear profit of 25 % on the transaction?

83. Having $3750, I gave 8 % of it for flour, and 10 % of the remainder for pork. What was the amount of my investment?

84. A merchant having $6120, invested $12\frac{1}{2}\%$ of it in dry-goods, and 16 % of the remainder in groceries. How much did he pay for both?

85. A trader having $5820, invested $13\frac{1}{3}\%$ of it in horses, and $12\frac{1}{2}\%$ of the remainder in cattle. How much money had he left?

86. A man owning property worth $4200, bequeathed $37\frac{1}{2}\%$ of it to his son, $46\frac{2}{3}\%$ of the remainder to his daughter, and the rest to his wife. Find wife's share.

87. A stock dealer having $3120, spent $16\frac{2}{3}\%$ of it for hogs, 32 % of the remainder for cattle, and the balance for mules, at $68 apiece. How many mules did he buy?

88. A trader having $2400, paid $18\frac{3}{4}\%$ of it for sheep, 24 % of the remainder for cattle, and the rest for horses, at $78 each. How many horses did he buy?

89. A manufacturer commencing business with $5250, gained 22 % of his capital the first year, and 33⅓ % of that amount the second year. How much money had he then?

90. A grain merchant paid $1320 for corn, at 48 cts. a bushel, and sold 32 % of it at a profit of 16⅔ %. What did he receive for what he sold?

91. A merchant having begun business with $13125, gained 14⅔% of it the first year, and 16⅔% of this amount the second year. The third year he lost 25 % of his entire capital. How much money had he then?

92. Paid $19.80 for a case of six dozen slates, and sold them at a profit of 20 %. What was the selling price of each slate?

93. Paid $888 for 37 cows, and sold them at a profit of 15 %. Find the average selling price per head.

94. A pedestrian having 75 miles to walk, accomplished 44 % of the distance in 5.5 hrs. At what rate per hour did he travel?

95. A drover had 160 hogs, which he sold at $7.50 apiece, and then spent 55 % of the money for sheep, at $2.75 each. How many sheep did he buy?

96. A grain dealer paid $1050 for corn, at 56 cts. a bushel, and sold 46⅔ % of it at a profit of 12½ %. What did he receive for the quantity sold?

97. A farmer had 175 hogs, which he sold at $6.60 each, and invested 41⅔ % of the money in sheep, at $3.85 each. How many sheep did he buy?

98. A speculator paid $518.40 for flour, at $5.40 a barrel, and sold 31¼ % of it at a profit of 11⅑ %. How much did he receive for the quantity sold?

99. Sold a farm of 120 acres, at $62.50 per acre, and invested 66 % of the money in suburban lots, at $330 each. How many lots did he buy?

100. A farm of 45 acres yielded 65 bu. of corn per acre, and 64 % of the crop was sold for $1029.60. What was the selling price per bushel?

101. Paid $607.50 for flour, at $4.50 a barrel, and sold $55\frac{5}{9}$ % of it at a gain of $13\frac{1}{3}$ %. How much did I receive for the quantity sold?

102. $37\frac{1}{2}$ % of $44\frac{4}{9}$ % of $66\frac{2}{3}$ % of $128304 was paid for $22\frac{1}{2}$ % of a section of farm land. What was the cost per acre.

## Article 165.—Case II.

1. What % of 260 is 13?
2. What % of 350 is 28?
3. What % of 32 is 2.4?
4. What % of 187.5 is 22.5?
5. What % of 555 is 99.9?
6. What % of 640 is 144?
7. What % of 18.72 is 4.68?
8. What % of 111.25 is 40.05?
9. What % of 12.5 is 5.5?
10. What % of 150 is 93.75?
11. What % is 45 men of 675 men?
12. What % is $314.50 of $1850?
13. What % is 426 gal. of 1775 gal.?
14. What % is 187 acres of 340 acres?
15. What % is 195 tons of 500 tons?
16. What % is 432 bu. of 675 bu.?
17. What % is 875 miles of 1125 miles?
18. What % is 2835 cu. ft. of 3240 cu. ft.?
19. What % is 742.5 lb. of 750 lb.?
20. What % is $176.75 of $175?
21. .945 is what percent of .7?
22. 2.664 is what percent of .555?

23. .1 is what percent of .01?
24. .01 is what percent of .1?
25. $1\frac{1}{2}$ is what percent of $\frac{3}{8}$?
26. 9.7 is what percent of 1940?
27. $\frac{2}{5}$ is what percent of $\frac{3}{4}$?
28. $\frac{1}{250}$ is what percent of $\frac{16}{25}$?
29. $\frac{25}{36}$ is what percent of $\frac{5}{6}$?
30. $\frac{4}{5}$ is what percent of $\frac{2}{8}$?
31. What percent is $\frac{5}{8}$ of $7\frac{1}{2}$?
32. What percent is $1\frac{3}{4}$ of $2\frac{1}{2}$?
33. What percent is $3\frac{1}{3}$ of $4\frac{1}{6}$?
34. What percent is $\frac{5}{8}$ of $9\frac{3}{8}$?
35. What percent is $\frac{1}{80}$ of $\frac{25}{16}$?
36. What percent is $77\frac{7}{9}$ of $66\frac{2}{3}$?
37. What percent is $112\frac{1}{2}$ of $83\frac{1}{3}$?
38. What percent is .45 of 50?
39. What percent is 1 of 10000?
40. What percent is .015 of .3?

NOTE.—*Take* 1 *percent of the number following the preposition "of" for the divisor. In common fractions invert the fraction following the preposition "of," and multiply by* 100.

41. What percent of 4 bu. 2 pks. 6 qts. is 1 bu. 5 qts. 1 pt.?

42. A man owing a debt of $1680, paid $\frac{9}{16}$ of it. What percent remained unpaid?

43. In a school of 480 pupils, 36 were absent on a certain day. What percent were present?

44. Having $720 in bank, I drew out $468. What percent remained in bank?

45. Out of a flock of 350 pigeons, 77 were killed. What percent escaped?

46. A speculator having $4875, invested $\frac{14}{25}$ of it in city property. What percent of his money remained unexpended?

47. Sold a house for $2125, which cost me $2500. What percent did I lose?

48. Bought a team for $450, and sold it for $531. What percent did I gain?

49. Out of an army of 45000 men, 5625 were killed in battle and 10125 were wounded. What percent of the soldiers was uninjured?

50. A man dying, left an estate of $6300, giving $3750 to his son, and the remainder to his daughter. What percent of the son's share did she receive?

51. A farmer owning 250 acres of land, sold a part of it for $11900, at $85 an acre. What percent of his land did he sell?

52. A tract of land in the form of a rectangle is 75 rods wide, and contains 56 acres 40 sq. rods. What percent of the length is the breadth?

53. If I sell $\frac{5}{9}$ of a farm for what $\frac{2}{3}$ of it cost, what is the gain percent?

54. If $\frac{5}{8}$ of an article be sold for what $\frac{3}{5}$ of it cost, what percent is lost?

55. A miller keeps 6 qts. out of every 3 bu. that he grinds. What percent is his toll?

56. An agent sold a house for $2250, and sent the owner $2175. What percent commission did he charge?

57. An insurance company, with a capital stock of $250000, declared a dividend of $21250. What was the percent of dividend?

58. Strawberries cost $3.20 a bushel, and were sold at $12\frac{1}{2}$ cts. a quart. What percent was gained?

59. Paid $300 for apples, at $2.40 a barrel, and sold 75 bls. for $210. What percent did I gain on the quantity sold?

60. A bought a farm of 175 acres for $12600, and sold B 100 acres for $6120. What percent did he lose on the part sold?

61. A speculator bought a farm of 135 acres for $9720, and sold 55 acres for $5346. What percent did he gain on what he sold?

62. A fruit-dealer paid $560 for potatoes, at $3.20 a barrel, and sold 85 bls. for $306. What percent did he gain on the number of barrels sold?

63. Sold a piece of property for $2520, thereby losing $240. What percent would have been gained by selling it for $3128?

64. A trader sold 75 horses for $7350, thereby gaining $787.50. If he had sold them at $100 per head, what would have been his gain percent?

65. $62\frac{1}{2}\%$ of $83\frac{1}{3}\%$ of $14256 is what percent of $31\frac{1}{4}\%$ of $24000?

## Article 166.—Case III.

1. 37 is 5 % of what number?
2. 10 is 8 % of what number?
3. 54 is 12 % of what number?
4. 84 is 15 % of what number?
5. 1125 is 18 % of what number?
6. 300 is 24 % of what number?
7. 1134 is 35 % of what number?
8. 1650 is 44 % of what number?
9. 490 is 56 % of what number?
10. 9240 is 96 % of what number?
11. 31.5 is 4.2 % of what number?
12. 48.6 is 7.5 % of what number?
13. 148.2 is 15.6 % of what number?
14. 225.4 is 18.4 % of what number?
15. 7375.5 is 39.6 % of what number?
16. 11988 is 55.5 % of what number?
17. .5 is 12.5 % of what number?

18. 1.4 is 1.75 % of what number?
19. 154.35 is 12.25 % of what number?
20. 9437.5 is 125 % of what number?
21. $18\frac{3}{4}$ is $7\frac{1}{2}$ % of what number?
22. $83\frac{1}{3}$ is $22\frac{2}{9}$ % of what?
23. $32\frac{7}{8}$ is $6\frac{1}{4}$ % of what?
24. $68\frac{3}{4}$ is $9\frac{1}{6}$ % of what?
25. $88\frac{8}{9}$ is $41\frac{2}{3}$ % of what?
26. $\frac{3}{4}$ is $\frac{2}{5}$ % of what?
27. 1 is $\frac{4}{9}$ % of what?
28. $1\frac{1}{4}$ is $\frac{4}{5}$ % of what?
29. $\frac{7}{24}$ is $\frac{3}{8}$ % of what?
30. $1\frac{3}{4}$ is $1\frac{3}{5}$ % of what?
31. $18.30 is $7\frac{1}{2}$ % of what?
32. 31 men is $3\frac{1}{3}$ % of what?
33. 286 bu. is $27\frac{1}{2}$ % of what?
34. 4 miles is $\frac{5}{6}$ % of what?
35. 880 lb. is 64 % of what?
36. $5670 is 324 % of what?
37. 945 acres is 675 % of what?
38. 84 gal. is .7 % of what?
39. 369 tons is 1025 % of what?
40. 51 bls. is 8.5 % of what?

NOTE.—*In common fractions, invert the percent and multiply by* 100.

41. A hunter killed 63 pigeons, which was 18 % of the flock. How many escaped?
42. I paid a debt of $135, which was $18\frac{3}{4}$ % of my capital. What was my capital?
43. The brokerage at $1\frac{3}{4}$ % for selling insurance stock was $26.25. What was the face value of the stock?
44. An agent's commission for buying land was

$134.40. If he was allowed $3\frac{1}{2}\%$, what was tne amount of the purchase?

45. A man spent $37\frac{1}{2}$, which was $6\frac{1}{4}\%$ of all his money. How much had he.

46. A farmer sold $67\frac{1}{2}$ bu. of corn, which was $18\frac{3}{4}\%$ of his crop. What was the remainder worth, at 50 cts. a bushel?

47. A grain-dealer sold 798 bu. of wheat, which was $47\frac{1}{2}\%$ of his entire stock. If he had sold the remainder at $1.25 a bushel, what would he have received for it?

48. I spent $37.80, which was $22\frac{1}{2}\%$ of what I had remaining. What had I at first.

49. B sold a carriage at a profit of $16\frac{1}{2}\%$, thereby gaining $41.25. What did he receive for it?

50. Sold a horse at a profit of $15.50, thereby gaining $12\frac{1}{2}\%$. What was the selling price?

51. Sold a watch at a loss of $12\frac{1}{2}\%$, thereby losing $5.50. What was the selling price?

52. An agent's commission for selling grain was $19.20. If the rate of commission was $1\frac{1}{2}\%$, what was the amount of the sale?

53. A owes B $357, which is $43\frac{3}{4}\%$ of what he owes C. How much does he owe C?

54. A fruit-grower sold 782 bu. of apples, which was $42\frac{1}{2}\%$ of his entire crop. What was the remainder worth, at $37\frac{1}{2}$ cts. a bushel?

55. B lost $5, which was $14\frac{2}{7}\%$ of his money. How much had he left?

56. Paid $1.50 for hauling 75 bu. of coal, which was $11\frac{1}{9}\%$ of the cost. What did I pay per bushel for the coal?

57. A pays $17.50 a month for his board, which is 14 % of his salary. What is his yearly salary?

58. 36 men of a regiment were killed in a skirmish,

which was 4.8 % of the entire number. How many men composed the regiment.

59. A farmer sold 40 sheep, which was 6.4 % of the flock. How many had he?

60. I sold 84 acres of land, which was 35 % of what I had remaining. What was the entire farm worth, at $55 per acre?

61. Owning 84 % of a steamboat, I sold 25 % of my share for $2163. What was the value of the steamboat?

62. A man who owned 75 % of a farm, sold 48 % of his share for $864. Find the value of the farm.

63. A manufacturer owning 88 % of a factory, sold 37½ % of his share for $2871. Find value of the factory, the percent left, and its value.

64. A speculator who owned 75 % of a vessel, sold 44 % of his share for $1603.80. Find value of the vessel, the percent left, and its value.

65. Owning 72 % of a tract of woodland, I sold 62½ % of my share for $3375. Find value of the tract, the percent left, and its value.

66. Sold a horse at a loss of 13⅓ %, thereby losing $12. How much did I receive for him?

67. A trader sold 56 head of cattle for $2898, which was 115 % of the cost. At what price, per head, should he have sold them to gain 16⅔ %?

68. 37½ % of 96 % of $1750 is 30 % of 70 % of what?

## Article 167.—Case IV.

1. What number increased by 8 % of itself equals 243?

2. What number increased by 10 % of itself equals 363?

3. What number diminished by 12 % of itself equals 638?

4. What number diminished by 28 % of itself equals 756?

5. 1596 is 33 % greater than what number?

6. 1980 is 44 % greater than what number?

7. 1122 is 32 % less than what number?

8. 1518 is 45 % less than what number?

9. 840 is 110 % more than what number?

10. 69 is 99 % less than what number?

11. What number + 7.5 % of itself equals 1032?

12. What number — 6.5 % of itself equals 598.4?

13. What number + $6\frac{2}{3}$ % of itself equals 272?

14. What number — $18\frac{3}{4}$ % of itself equals 425.1?

15. Find a number which, added to 245 % of itself, will equal 6348.

16. Find a number which, added to 1.5 % of itself, will equal 3775.8.

17. Find a number which, added to $\frac{4}{5}$ % of itself, will equal 1260.

18. Find a number which, diminished by .4 % of itself, will equal 1494.

19. Find a number which, diminished by $99\frac{8}{9}$ % of itself, will equal 1.03.

20. Find a number which, diminished by $37\frac{1}{2}$ % of itself, will equal $37\frac{1}{2}$.

21. Paid $116.25 for a piano, which was 7 % less than its value. Find its value.

22. Bought a watch for $81, which was 8 % more than its value. What was it worth?

23. Sold a team for $315, which was a loss of 16 %. How much did I pay for it?

24. A carriage was sold for $299, which was 15 % more than the cost. Find the cost.

25. Sold my furniture at a sacrifice of $22\frac{1}{2}\%$, receiving only $806 for it. Find the cost.

26. A speculator gained 19 % of his capital, and then had $3808. How much had he at first?

27. A trader disposed of his stock for $1425, thereby losing 24 %. How much did he lose?

28. A merchant gained 28 % of his capital during a certain year, and then had $4320. How much did he gain?

29. A wholesale dealer sold 180 bls. of flour for $1128.60, which was at a gain of 32 %. What was the cost per barrel?

30. A stock-dealer sold 175 head of horses for $9758, which was at a loss of 18 %. What was the average cost per head?

31. The rent of my house last year was $336, which is 5 % more than I paid this year. The rent this year is 92 % less than the value of the property. What is the property worth?

32. A merchant's profits in 1891 were $2310, which was 12 % less than in 1892. In 1892 they were 75 % less than his capital in 1891. What was his capital in 1891?

33. A speculator gained 16 % of his capital the first year, and 20 % of that amount the second year, and then had $3828. What was his original capital?

34. A trader spent 24 % of his money for horses, and 32 % of the remainder for cattle, and had $1938 remaining. How much money had he at first?

35. A stock company increased its capital $22\frac{1}{2}\%$ during a certain year, and 25 % of that amount the following year, and then had $153125. What was its original capital?

36. A real estate dealer invested 36 % of his money

in a farm, 55 % of the remainder in city property, and the balance in 27 town lots, at $144 each. How much had he at first?

37. A has $3009, which is 18 % more than B's money, and 15 % less than C's. How much have B and C together?

38. A lady spent 30 % of her money in one store, 25 % of the remainder in another, and 15 % of what then remained in another. She then had only $71.40 left. How much did she spend altogether?

39. A trader gained 10 % of his capital in one speculation, $12\frac{1}{2}$ % of that amount in another, and 20 % of the last amount in a third. He then had $5049. Find his gain in the three speculations.

40. A speculator invested 28 % of his money in cotton, 45 % of the remainder in pork, and with the balance bought 1716 bu. of wheat, at 75 cts. a bushel. How much did he pay for the pork?

41. Paid $2070 for a house, which was 15 % more than its value. I sold it for $8\frac{1}{3}$ % less than its value. Find my loss on the transaction.

42. A trader sold 75 head of cattle for $1575, which was at a loss of $12\frac{1}{2}$ %. At what price per head should he have sold them to gain $16\frac{2}{3}$ %?

43. A farmer bought 64 sheep, at $3.75 each, and the money paid for them was 74.4 % less than what he received for a lot of hogs, at $6.25 apiece. How many hogs did he sell?

44. An improvement company bought a farm of 150 acres, and then sold $33\frac{1}{3}$ % of it for $5000, which was at a gain of 25 %. What did they pay for the farm per acre?

45. 45 % of 80 % of $750 is 10 % less than 40 % of 60 % of what?

## Article 169.

### Miscellaneous Examples.

1. In a school of 480 pupils, $43\frac{3}{4}\%$ were boys. How many girls were there?

2. A poulterer had 27 doz. ducks, but $11\frac{1}{9}\%$ of them died. If he sold the remainder at 35 cts. apiece, what did he receive for them?

3. A farmer had 175 hogs, which he sold at $4.80 each, and invested 45 % of the money in sheep, at $3.15 apiece. How many sheep did he buy?

4. A stock-dealer having $2800, spent $14\frac{2}{7}\%$ of it for sheep, $37\frac{1}{2}\%$ of the remainder for cattle, and the balance for mules, at $60 per head. How many mules did he buy?

5. Sold a lot of lumber for $127.60, thereby losing 12 %. For how much should I have sold it to gain 15 %?

6. Sold two lots for $1627.50 each, gaining 24 % on one, losing 16 % on the other What did I gain or lose by the transaction?

7. Sold a horse at a profit of $17\frac{1}{2}\%$, thereby gaining $21. Find the selling price.

8. A sold B a farm and gained 16 %. B sold it to C and gained 12 %. C sold it to D for $1421, and lost $12\frac{1}{2}\%$. What did the farm cost A?

9. Owning $87\frac{1}{2}\%$ of a steamboat, I sold 56 % of my share for $6664. Find the value of the boat, the percent left, and what it was worth

10. Find $\frac{2}{5}\%$ of $3\frac{1}{8}$. What % of .3 is .015? $18\frac{3}{4}$ is $8\frac{1}{3}\%$ of what? $946 is $7\frac{1}{2}\%$ more than what? 138.96 is $3\frac{1}{2}\%$ less than what?

11. Sold a carriage for $319, thereby gaining 16 % For how much should I have sold it to gain 20 %?

12. Sold a watch at a loss of $7\frac{1}{2}\%$, thereby losing $6.30 Find the selling price.

13. Sold grain on a commission of $1\frac{1}{2}\%$. If the commission was $19.20, what was the amount of the sale?

14. Bought a farm for $1581, which was 15 % less than its value. I sold it at 5 % more than its value. Find my gain.

15. Bought a factory for $4350, which was 16 % more than its value. I sold it at 12 % less than its value Find my loss.

16. A grain-dealer paid $1350 for wheat, at $.60 a bushel, and sold $53\frac{1}{3}\%$ of it at a profit of $16\frac{2}{3}\%$. How much did he receive for what he sold?

17. A speculator bought a farm of 160 acres for $10000, and sold 64 acres for $4800. What percent did he gain on the part sold?

18. Sold a horse at a loss of $17\frac{1}{2}\%$, thereby losing $35. What did I receive for him?

19. A trader sold 96 head of cattle for $4320, which was at a gain of $12\frac{1}{2}\%$. At what price per head should they have been sold to gain 25 %?

20. 15 of my sheep died, which was 12 % of what I had remaining. If I paid $3.75 apiece for them, what did the entire flock cost?

21. A speculator paid $360 for wheat, at 75 cts. a bushel, and sold $68\frac{3}{4}\%$ of it for $287.10. What percent did he gain on the quantity sold?

22. An agent sold 168 bales of cotton, each weighing 240 lb., at $31\frac{1}{4}$ cts. a pound, 80 hhds. of tobacco, of 360 lb. each, at $26\frac{2}{3}$ cts. a pound; and 128 bls. of sugar, each weighing 180 lb., at $6\frac{1}{4}$ cts. a pound. Find his entire commission, at $2\frac{1}{2}\%$?

23. A grain merchant paid $1822.50 for corn, at $56\frac{1}{4}$ cts. a bushel, and sold $73\frac{1}{3}\%$ of it for $1544.40. At what price per bushel did it sell?

24. Bought 120 cords of wood for $570, and sold

$41\frac{2}{3}$ % of it for $294.50. What percent did I gain on the part sold?

25. Bought a piano for $315, which was 16 % less than its value. I sold it for 8 % more than its value. Find my gain.

26. A lady spent 36 % of her money in one store, $37\frac{1}{2}$ % of the remainder in another, and 35 % of what then remained in another. She then had only $32.50. How much had she at first?

27. A farmer owning 180 acres of land, sold a part of it for $3000, at $62.50 per acre. What percent of his land did he sell?

28. A coal merchant sold 960 bu. of anthracite coal, which was 12.8 % of his entire stock. What was the remainder worth, at 25 cts. a bushel?

29. I owe A $142.80, which is 12 % more than I owe B, and 15 % less than I owe C. How much do I owe altogether?

30. Sold 125 bls. of apples for $501.50, which was at a gain of 18 %. What percent would I have gained by selling them at $4.25 a barrel?

31. A trader sold 125 head of horses for $10125, thereby losing 10 %. For how much per head should they have been sold to gain $11\frac{1}{9}$ %?

32. Owning 56 % of a factory, I sold $37\frac{1}{2}$ % of my share for $3675. At that rate, what was my remaining interest worth?

33. Sold two houses for $2520 each, gaining 12 % on one, losing 10 % on the other. What did I gain or lose by the transaction?

34. A farmer bought 36 head of cattle, at $45 a head; 6 having died, he sold the remainder at $60 per head. What percent did he gain on the transaction?

35. 12 % of $1500 is $12\frac{1}{2}$ % more than $12\frac{4}{5}$ % of what?

36. Sold a horse for $105, which was $87\frac{1}{2}\%$ of what I paid for him. What percent would I have made by selling him for $140?

37. Sold a buggy for $189, which was 16 % less than I paid for it. For what sum should I have sold it to gain 16 %?

38. Paid $10500 for land, at $62.50 an acre, and sold $37\frac{1}{2}\%$ of it for $4725. What percent did I gain on what I sold?

39. Paid $2160 for wheat, at $1.12\frac{1}{2}$ per bushel, and sold $43\frac{3}{4}\%$ of it at a profit of $13\frac{1}{3}\%$. How much did I receive for the quantity sold?

40. Bought 250 bls. of flour, at $4.40 a barrel, and sold 70 % of it for $885.50. What percent did I gain on what I sold?

41. A farmer owning 225 acres of land, sold a part of it for $12375, at $125 an acre. What percent of his land did he sell?

42. Sold 72 sheep, which were $13\frac{1}{3}\%$ of what I had remaining. How many had I at first?

43. Sold 475 bu. of corn, which was 20 % of what I had remaining. What percent of the entire quantity did I sell?

44. $8\frac{1}{3}\%$ of $1980 is $8\frac{1}{3}\%$ less than $8\frac{1}{3}\%$ of what?

## Article 172.

## Commission.

1. An agent sold a farm for $3960, at $2\frac{1}{3}\%$ commission. What was his commission?

2. A factor sold 128 bls. of sugar, each weighing 240 lb., at $8\frac{1}{3}$ cts. a pound. Find his commission, at $2\frac{3}{4}\%$.

3. A commission merchant sold 260 bls. of sugar,

each weighing 240 lb., at $8\frac{3}{4}$ cts. a pound, and 185 bls. of molasses, each containing 48 gal., at $62\frac{1}{2}$ cts. a gallon. Find his entire commission, at 2 %.

4. A correspondent sold 320 bales of cotton, each weighing 280 lb., at $18\frac{3}{4}$ cts. a pound, and 280 boxes of oranges, each containing 15 doz., at $37\frac{1}{2}$ cts. a dozen. What was his rate of commission, if he received $612.50 for making the sale?

5. An agent sold a house for $2450, at $1\frac{1}{2}$ % commission. What sum did he send the owner?

6. An agent's commission for selling $9240 worth of cotton was $231. What was the rate of commission?

7. My commission for buying $7880 worth of lumber was $137.90. What percent was allowed me?

8. An agent sold city property for $5440, and sent the owner $5317.60. What percent commission did he retain?

9. A factor sold a cargo of rice on a commission of $1\frac{1}{2}$ %, and sent the owner $4678.75. What was his commission?

10. A correspondent sold a lot of grain on a commission of $2\frac{1}{2}$ %. If he received $79, what was the amount of the sale?

11. A commission merchant sold a consignment of wheat on a commission of $3\frac{1}{2}$ %. If his commission amounted to $100.10, what sum did he send the owner?

12. An attorney collected a claim at $7\frac{1}{2}$ % commission, and sent the owner $3468.75. What was the amount of the claim, and what was his commission?

13. An auctioneer sold goods on a commission of $4\frac{1}{2}$ %, and sent the owner $5118.80. What was his commission?

14. A commission merchant sold 58 bales of cotton, each weighing 210 lb., at 25 cts. a pound, on a commission

of $3\frac{1}{8}\%$. He invested the net proceeds in wheat, at $1.16 a bushel, after reserving his commission of $1\frac{1}{2}\%$ for buying. How many bushels of wheat did he buy?

15. A sale of real estate returned as net proceeds $3494.45, after paying $56.75 charges, and a commission of $3\frac{1}{2}\%$. What was the amount of the sale?

16. The net proceeds of the sale of a cargo of sugar were $12331.50, after deducting $187.50 charges, and a commission of $2\frac{1}{2}\%$. What was the amount of the sale?

17. A sale of real estate returned as net proceeds $5425, after deducting $75.80 charges, and the agent's commission of $4\frac{1}{2}\%$. What was the amount of the sale?

18. An agent sold a cargo of grain, and remitted the owner $12300, after deducting $131.25 charges, and a commission of $2\frac{1}{2}\%$. For how much was the grain sold?

19. A commission merchant sold a boatload of lumber, and sent the owner $2316.95, after paying $75.40 charges, and retaining his commission of $2\frac{3}{4}\%$. What was his commission?

20. A sale of city property realized $5347.40 to the owner, after paying $65.20 charges, and the agent's commission of $3\%$. What was the commission?

21. A sale of 64 acres of land realized $4010 to the owner, after deducting $56.40 charges, and the agent's commission of $2\frac{1}{4}\%$. At what price per acre did the land sell?

22. Received $1912.50 to invest in wool. After reserving my commission of $2\%$, how much did I pay for the wool?

23. Sent a commission merchant $3363.75 to buy flour, at $5 a barrel, after keeping his commission of $3\frac{1}{2}\%$. How many barrels did he buy?

24. An agent received $3544.50 to invest in rye, at $62\frac{1}{2}$ cts. a bushel, after retaining his commission of 2 %. How many bushels did he buy?

25. Sent my correspondent $1691.25 to purchase wool at $37\frac{1}{2}$ cts. a pound, after retaining his commission of $2\frac{1}{2}$ %. How many pounds did he buy?

26. Remitted $2121.35 to my agent to buy flour. After reserving his commission of $1\frac{1}{2}$ %, how many barrels did he buy, at $4.75 a barrel?

27. An agent received $2511.25 to purchase tobacco, at 35 cts. a pound, after keeping his commission of $2\frac{1}{2}$ %. How many pounds did he buy?

28. An agent was allowed to retain a commission of $2\frac{1}{2}$ % for buying. If he received $4561.25 to make the purchase, what sum was paid as his commission?

29. A commission merchant sold a consignment of lumber on a commission of 2 %, for $2548. He invested the net proceeds in tobacco, after retaining another commission of 4 % for buying. What sum was invested in the tobacco, and what was his entire commission?

30. An agent sold a cargo of corn for $7917, on a commission of $2\frac{1}{2}$ %. He invested the net proceeds in cattle, after reserving his commission of $1\frac{1}{2}$ % for buying. What was the value of the cattle?

31. A solicitor collected a debt of $3780, on a commission of $5\frac{1}{2}$ %. He invested the net proceeds in a farm, after deducting a commission of 5 % for buying. What was his whole commission?

32. A real estate dealer sold a farm for $4140, on a commission of 8 %. He was instructed to buy city property with the net proceeds, after having retained $3\frac{1}{2}$ % for making the purchase. How much did he pay for it, and what was his entire commission?

33. A commission merchant sold 175 bls. of beef,

each weighing 200 lb., at 9 cts. a pound, on a commission of $3\frac{1}{3}\%$. He invested the net proceeds in flour, at $3.75 a barrel, after reserving his commission of $1\frac{1}{2}\%$ for buying. How many barrels of flour did he buy?

34. A factor sold a lot of grain for $2448, on a commission of $4\%$. He invested the net proceeds in tobacco, after keeping his commission of $2\%$ for buying. How much did he pay for the tobacco?

35. An agent sold a consignment of molasses for $3978, on a commission of $2\frac{1}{2}\%$. He bought wheat with the net proceeds, after reserving a commission of $2\%$ for buying. What was the value of the wheat, and his entire commission?

36. An agent sold a lot of cotton for $3977, on a commission of $3\%$. He then invested the net proceeds in lumber, after deducting his commission of $2\frac{1}{2}\%$ for buying. How much did he pay for the lumber?

37. A commission merchant sold a consignment of tobacco for $1957, on a commission of $5\%$. He invested the net proceeds in grain, after keeping his commission of $3\%$ for buying. What was his commission for buying the grain?

38. A commission merchant sold a cargo of sugar for $39585, on a commission of $2\frac{1}{2}\%$. He bought coffee with the net proceeds, after having retained his commission of $1\frac{1}{2}\%$ for buying. How much did he receive for buying the coffee?

39. Sold lumber for $984, on a commission of $4\%$. Invested the net proceeds in wheat, after reserving my commission of $2\frac{1}{2}\%$ for buying. Find entire commission.

40. A commission merchant sold a consignment of tobacco for $1783.50, on a commission of $3\frac{1}{3}\%$. He then invested the net proceeds in potatoes, at $1.45 a bar-

rel, after retaining a commission of $2\frac{1}{2}\%$ for buying. How many barrels did he buy, and what was his entire commission?

41. A factor sold 52 bales of cotton, each weighing 246 lb., at 25 cts. a pound, on a commission of $2\frac{1}{2}\%$. He invested the net proceeds in wheat, at $1.17 a bushel, after retaining his commission of $2\frac{1}{2}\%$ for buying. How many bushels did he buy?

42. A real estate agent sold some city property on a commission of 6 %. He bought a farm with the net proceeds, after retaining his commission of 4 % for buying. If his entire commission was $750, how much did he receive for buying the farm?

43. A factor sold a lot of cotton on a commission of 4 %. He invested the net proceeds in grain, after keeping his commission of 3 %. If his entire commission was $245, what was the value of the grain?

44. A cattle-broker sold a drove of hogs on a commission of 5 %. He was instructed to purchase horses with the net proceeds, after retaining a commission of $2\frac{1}{2}\%$ for making the purchase. His entire commission was $225. How much did he receive for the hogs?

45. An agent sold flour on a commission of 2 %. He then bought sugar with the net proceeds, after reserving his commission, of $1\frac{1}{2}\%$. If his entire commission was $75, and the sugar cost 5 cts. a pound, how many pounds did he buy?

46. A commission merchant sold lumber on a commission of $2\frac{1}{2}\%$. He then bought wool at $37\frac{1}{2}$ cts. a pound, with the net proceeds, after reserving his commission of 4 % for buying. If his entire commission was $250, how many pounds of wool did he buy?

47. My agent sold a lot of tobacco on a commission of $2\frac{1}{2}\%$. He invested the net proceeds in wheat, at

$1.30 a bushel, after keeping his commission of 2 % for buying. If his whole commission was $90, how many bushels did he buy?

## Article 173.

### Trade Discount.

1. A bill of goods amounted to $1260, but the buyer was allowed $\frac{1}{3}$ and 10 % off. How much did he pay?

2. The retail price of an invoice of groceries was $1350, but the purchaser received a discount of $\frac{1}{5}$ and 12 % off. What was the cost?

3. The marked price of a lot of boots and shoes was $1500, but the dealer allowed $\frac{1}{6}$, 10, and 4 % off. What was paid for the lot?

4. The list price of a quantity of hardware was $960, but the buyer was given discounts of $12\frac{1}{2}$, $8\frac{1}{3}$, and 5 % off. How much did he pay?

5. Bought 36 kegs of nails, each containing 100 lb., at 6 cts. a pound, but received a discount of $\frac{1}{8}$ and 10 % off. What was the net price?

6. The retail price of a bill of dry-goods was $1650, but the dealer gave a discount of $16\frac{2}{3}$, 16, and 4 % off. What was the cost of the goods?

7. The marked price of a lot of notions was $2550, but the purchaser was allowed a discount of 20, 15, and 5 %. How much did he pay for them?

8. A wholesale druggist sold an invoice of $2250, at $\frac{1}{6}$, 12, and 5 % off. What did he receive for the goods?

9. The list price of a shipment of canned fruits was $1750, but the buyer received a discount of 20 and $12\frac{1}{2}$ % off. How much did they cost him?

10. A bill of groceries amounted to $2250, but the

dealer allowed 28, 15, and $8\frac{1}{3}$ % off. What was paid for them?

11. The marked price of a lot of furniture was $1680, but the manufacturer gave $\frac{1}{6}$, 15, and 10 % off. How much was the bill to the retailer?

12. The retail price of an invoice of marble was $1800, but the wholesale dealer allowed $16\frac{2}{3}$, $12\frac{1}{2}$, and 8 % off. What was the cost of the marble?

13. The list price of a lot of encyclopedias was $1280, but the publishers gave a discount of $18\frac{3}{4}$, $16\frac{2}{3}$, and $2\frac{1}{2}$ % off. What did the retail dealer pay?

14. The cost of a bill of dry-goods was $712.50, which was a reduction of 5 % from the retail price. What was the list price?

15. A dealer paid $403.20 for a lot of pictures, which was a discount of $\frac{1}{8}$ and 4 %. What was the retail price?

16. The net price of an invoice of toys was $1060.29, the purchaser having been allowed 16, 15, and 10 % off. What was the list price?

17. The wholesale price of a bill of hardware was $1915.90, which was a reduction of 15, $12\frac{1}{2}$ and 8 % from the retail price. What was the retail price?

18. A retail merchant bought a bill of groceries for $1472.62$\frac{1}{2}$, after having received a discount of 28, 15, and $12\frac{1}{2}$ % off. What was the marked price.

19. A consignment of boots and shoes cost the dealer $1122, after deducting his discounts of 20, 15, and 12 %. What was the list price?

20. Paid $2565 for a lot of carpets, which was a discount of 20, 10, and 5 % from the face of the bill. What was the retail price?

21. $942.48 was paid for a lot of desks, the manufacturer having allowed 28, 15, and 12 % off. What was the regular price?

22. Paid $2152.80 for the stock in my store, which was a reduction of $\frac{1}{5}$, 10, and 8 % from the regular price. What was the amount of the discounts?

23. The cost of a lot of furniture was $1499.40, the purchaser having received a discount of 16, 15, and $12\frac{1}{2}$% off. If he sold it at the retail price, how much did he gain?

24. Sold goods at 20, 15, and 10 % off, and the discounts amounted to $485. Find list price.

25. Bought goods at 12, $12\frac{1}{2}$, and 10 % off, and the discounts amounted to $660.05. Find list price.

26. Sold goods at 25, 20, and $16\frac{2}{3}$ % off, and the discounts amounted to $187.50. Find list price.

27. Bought goods at $16\frac{2}{3}$, 13, and 12 % off, and the discounts amounted to $452.50. Find list price.

28. Sold goods at 25, 16, and 5 % off, and the discounts amounted to $722.70. Find the *cost*.

29. Bought goods at $\frac{1}{5}$, 15, and 5 % off, and the discounts amounted to $654.90. Find the *cost*.

30. Sold goods at $\frac{1}{6}$, 10, and 4 % off, and the discounts amounted to $481.25. How much did the purchaser pay for them?

31. Bought goods at 20, $12\frac{1}{2}$, and 10 % off, and the discounts amounted to $555. What was the retail price?

## Articles 174 and 175.

### Profit and Loss.

1. A carriage that cost $375 was sold at a loss of $16\frac{2}{3}$ %. What was the loss?

2. Paid $240 for a span of horses, and sold them at a profit of $31\frac{1}{4}$ %. What was the gain?

3. The cost of a farm was $2475; the owner sold it at a loss of $6\frac{2}{3}$ %. How much did he receive for it?

4. A speculator sold a cargo of wheat, which cost him $6750, at a gain of $11\frac{1}{9}\%$. What was the selling price?

5. A trader having $3250, gained 18% of it the first year, and 24% of that amount the second year. How much money had he then?

6. A merchant having invested $4560 in business, lost $13\frac{1}{3}\%$ of it the first year, and $12\frac{1}{2}\%$ of the remainder the second year. How much was his stock then worth?

7. A manufacturer having $6640, gained $18\frac{3}{4}\%$ of it the first year, and $22\frac{1}{2}\%$ of that amount the second year. How much money had he then?

8. A grocer, whose stock cost him $4860, lost $8\frac{1}{3}\%$ of it the first year, $11\frac{1}{9}\%$ of the remainder the second year, and $9\frac{1}{11}\%$ of what then remained the third year. What was his entire loss?

9. Goods costing $125 were sold for $115. What percent was lost?

10. Bought a watch for $75, and sold it for $87.50. What percent was gained?

11. A carriage that cost $250 was sold at an advance of $35. What was the gain percent?

12. Sold a house for $2450, gaining $350. What percent was gained?

13. If I sell $\frac{4}{5}$ of an article for what $\frac{3}{4}$ of it cost, what percent do I lose?

14. If I sell $\frac{3}{4}$ of an article for what $\frac{7}{8}$ of it cost, what percent do I gain?

15. If I sell $\frac{5}{6}$ of an article for what $\frac{9}{10}$ of it cost, what percent do I gain?

16. If I sell $\frac{10}{11}$ of an article for what $\frac{7}{8}$ of it cost, what percent do I lose?

17. A dealer bought books from the publisher at a

discount of 25% from the list price, and sold them at the list price. Find his percent of gain.

18. Bought hats at $\frac{1}{5}$ and $12\frac{1}{2}$ % off the list price, and sold them at the list price. What was the percent of gain?

19. A speculator sold real estate for $2337, which was at a loss of 18 %. What percent would he have gained by selling it for $3325?

20. Sold a lot of lumber for $2212.50, thereby gaining 18 %. What percent would I have gained by selling it for $2325?

21. Sold a lot of dry-goods for $156.60, which was a loss of 13 %. What percent would I have gained by selling it for $207?

22. An agent sold a lot for $1800, gaining 20 %. If he had sold it for $1290, what percent would he have lost?

23. A foundry was sold at auction for $3960, which was $\frac{11}{16}$ of its cost. What was the loss percent?

24. A cargo of cotton being damaged, was sold for $10312.50, which was $\frac{33}{40}$ of its cost. What percent was lost by the sale?

25. A merchant increased his capital 16 % the first year, and gained 18 % of that sum the second year, and then had $5133. What was his original capital?

26. A speculator lost 12 % of his money in one operation, and 15 % of the remainder in another, and then had but $2431 remaining. What had he at first?

27. A real estate dealer gained 17 % of his capital in one trade, and 14 % of that amount in another, and then had $16672.50. What was his original capital?

28. A trader lost 13 % of his money by one speculation, and 16 % of the remainder by another. He then had $5481. What amount had he at first?

29. A merchant gained $12\frac{1}{2}\%$ of his capital the first year, and 15 % of that amount the second year, and then had $9936. What was his gain in the two years?

30. A gambler lost 24 % of his money at one time, and 30 % of the remainder at another, and then had but $3059. What was his entire loss?

31. A trader sold 78 horses for $5382, thereby losing 8 %. For how much per head should he have sold them to gain 12 %?

32. A drover sold 68 head of cattle for $2737, thereby gaining 15 %. For how much per head should they have been sold to gain 20 %?

33. A man lost $37.80, which was $22\frac{1}{2}\%$ of what he had remaining. How much money had he at first?

34. Sold a farm for $3910, losing 8 %. For how much should it have been sold to gain 12 %?

35. B sold his furniture for $135.30, which was at a loss of 18 %. For what sum should he have sold it to gain $13\frac{1}{3}\%$?

36. Sold a boatload of wheat for $2164.50, which was at a gain of 17 %. Find the gain.

37. Sold a lot for $714, which was at a loss of 15 %. What was the loss?

38. Sold a carriage at a profit of $12\frac{1}{2}\%$, thereby gaining $15.75. What did I receive for it?

39. Sold a lot of lumber at a loss of $17\frac{1}{2}\%$, thereby losing $437.50. How much did it bring?

40. Sold a house for $4930, by which I lost 15 %. For what sum should it have been sold to gain $12\frac{1}{2}\%$?

41. Sold a crop of potatoes for $367.36, which was at a loss of 18 %. For how much should they have been sold to gain $14\frac{2}{7}\%$?

42. By selling a lot of farming implements for $199.20 I lost 17 %. For what sum should I have sold them to gain $6\frac{1}{4}\%$?

43. A cattle-dealer increased his capital 17 % in one trade, and 18 % of that amount in another, and then had $3451.50. What was his entire profit?

44. By selling 85 horses for $5610 I lost 12 %. For how much per head should they have been sold to gain 16 %?

45. A sold B a farm, and gained 20 %; B sold it to C, and gained 15 %; C sold it to D for $1304.10, and lost 10 %. What did the farm cost A?

46. A sold B a house, and gained 30 %; B sold it to C, and gained 15 %; C sold it to D for $897, and lost 25 %. How much did A pay for it?

47. A sold B a lot of lumber, and gained 12 %; B sold it to C, and gained 15 %; C sold it to D for $2173.50 and lost 10 %. Find B's gain.

48. A sold B a farm, and gained 12 %; B sold it to C, and lost 10 %. C sold it to D for $4725, and gained 25 %. How much did B pay for it?

49. Sold a carriage at a profit of $22\frac{1}{2}$ %, thereby gaining $56.25. How much did I receive for it?

50. Bought a lot of corn for $398.40, which was 17 % less than its value. I sold it at 13 % more than its value. What sum did I gain?

51. Bought a farm for $1845, which was $12\frac{1}{2}$ % more than its value. I sold it at $7\frac{1}{2}$ % less than its value. What was my loss in the transaction?

52. Bought a lot of dry-goods for $1696.50, which was 13 % less than its value. Sold it at 15 % more than its value. How much did I gain?

53. Bought a house for $2240, which was $16\frac{2}{3}$ % more than its value. I sold it at $18\frac{3}{4}$ % less than its value. How much did I lose?

54. A trader bought two horses for $125 each, and, in selling them, gained 24 % on one, and lost 24 % on the other. What did he gain or lose by the sale?

55. Sold two houses at $3420 each, gaining 44 % on one, losing 24 % on the other. What was my gain or loss by the transaction?

56. Sold two farms at $3780 each, losing 12½ % on one, gaining 12½ % on the other. Did I gain or lose by the sale, and how much?

57. Sold two lots for $782 each, gaining 15 % on one, losing 15 % on the other. How much did I lose by the operation?

58. Paid $1750 each for two houses, and in selling lost 14 % on one, and gained 14 % on the other. What was my gain or loss by the sale?

59. Sold two lots of lumber for $2419 each, losing 18 % on one, gaining 18 % on the other. How much did I lose by the operation?

60. Sold two houses for $1386 each, gaining 32 % on one, losing 16 % on the other. What did I gain or lose by the sale?

61. Sold two farms for $1620 each, gaining 12½ % on one, losing 10 % on the other. Did I gain or lose by the transaction?

62. A stockdealer sold 69 horses for $7245, thereby losing 12½ %. At what price per head should they have been sold to gain 16⅔ %?

63. A sold B a farm for $4805, and gained 24 %. B then sold it, and lost 16 % on what it cost him. How much more did A gain than B lost?

64. A sold B a lot for $1475, and gained 18 %. Afterward B sold it and lost 18 % on what it cost him. How much more did B lose than A gained?

65. A sold B a team and carriage for $780, and lost 22 %. B then sold it, and gained 25 % on what it cost him. How much more did A lose than B gained?

66. C sold D a lot of flour for $1245, and lost 17 %.

Then D sold it, and gained 28 % on what it cost him. How much more did D gain than C lost?

67. Sold a farm at a profit of $17\frac{1}{2}$ %, thereby gaining $385. What did I receive for it?

68. A merchant reduced the price of a piece of cloth 8 cts. per yard, and in so doing he decreased his profit from $12\frac{1}{2}$ % to 10 %. What was the cost per yard?

69. A speculator increased the price of a boatload of grain $55.50, and thereby increased his profit from 12 % to 15 %. How much did he pay for the grain?

70. If a trader makes $15 on a horse, which he sells for $195, what percent does he gain?

71. If a merchant loses $29.60 on goods which he sells for $155.40, what percent does he lose?

72. A watchmaker sold two watches at the same price each, gaining 20 % on one, losing 20 % on the other. If he lost $8 by the transaction, what was the cost of each watch?

73. A farmer sold two horses at the same price each, gaining 25 % on one, losing 25 % on the other. If he lost $10 by the sale, what was the cost of each horse?

74. Sold two carriages for $210 each, gaining 40 % on one, losing 40 % on the other. What was the percent of loss by the transaction?

75. Sold a lot of apples at a gain of 30 %. If the cost to me had been $300 more, I would have lost 30 %. How much did I pay for them?

76. Sold a piece of property at a loss of 15 %. Had it cost me $600 less, I should have gained 15 %. How much did I pay for the property?

77. Sold an invoice of books at a loss $16\frac{2}{3}$ %. Had I paid $400 less, my gain would have been 25 %. What was the selling price?

78. A speculator sold 1250 bu. of wheat at a gain of 20 %. If it had cost him $350 more, he would have lost $6\frac{1}{4}$ %. How much per bushel did he receive?

79. Bought wine at $1.50 a gallon. 20 % having leaked out, at what price per gallon must I sell the remainder to gain 20 % on the whole?

80. Bought horses at $80 each. 10 % having died, at what price per head must the remainder be sold to gain $12\frac{1}{2}$ % on the entire cost?

## Articles 177 and 179.

### Brokerage and Stock Values.

1. Find the cost of 12 U. S. 5-20 bonds at par, brokerage $\frac{4}{5}$ %.

2. Find the cost of 17 U. S. 7-30 bonds at 8 % premium, brokerage $\frac{3}{4}$ %.

3. Find the cost of 26 B. & O. R. R. bonds at 6 % discount, brokerage $\frac{5}{8}$ %.

4. Find the cost of 32 C. H. & D. R. R. bonds at 112, brokerage $\frac{7}{8}$ %.

5. Find the cost of 38 shares C. & O. stock at $88\frac{1}{4}$, brokerage $\frac{3}{8}$ %.

6. The brokerage on 51 shares bank stock was $40.80. What was the percent?

7. A broker received $39.20, or a brokerage of $\frac{7}{10}$ %, for buying gas stock. How many shares did he buy?

8. The brokerage on 78 shares of canal stock was $68.25. What was the percent?

9. Bought 92 shares K. C. R. R. stock at $2\frac{3}{4}$ % discount, and sold it at $3\frac{5}{8}$ % premium. Find my gain.

10. Bought 86 shares O. & M. R. R. stock at $101\frac{5}{8}$, and sold it at $98\frac{1}{4}$. Find my loss.

11. A speculator paid $7643.25 for I. & C. R. R. stock at $96\frac{1}{4}$, brokerage $\frac{1}{2}$ %. How many shares did he buy?

12. A capitalist paid $11103.40 for P. C. R. R. stock at 107, brokerage $\frac{4}{5}$ %. How many shares did he buy?

13. The brokerage for selling insurance stock was $33.75. If the rate of brokerage was $\frac{3}{4}$ %, how many shares were sold?

14. How many shares at 2 % discount must be given for 49 shares at 6 % premium to sustain no loss?

15. How many shares at 4 % premium must be given for 169 shares at 4 % discount to sustain no loss?

16. Exchanged 126 shares of stock at $93\frac{3}{4}$ for stock at $87\frac{1}{2}$. How many shares of the latter did I receive?

17. Exchanged 144 shares of stock at $81\frac{1}{4}$ for stock at $112\frac{1}{2}$. How many shares of the latter did I receive?

18. Exchanged 76 shares bank stock at 15 % premium for canal stock at 8 % discount. How many shares did I receive?

19. Exchanged 112 shares turnpike stock at 9 % discount for gas stock at 4 % premium. How many shares did I receive?

20. Bought bonds at $3\frac{3}{8}$ % premium, and sold them at $2\frac{1}{2}$ % discount, thereby losing $176.25. What was the par value?

21. Bought bonds at $2\frac{1}{2}$ % discount, and sold them at $1\frac{1}{2}$ % premium, thereby gaining $140. What was the par value?

22. Bought stock at $3\frac{1}{4}$ % premium, and sold it at $1\frac{1}{2}$ % discount, thereby losing $356.25. What was the face value?

23. Bought stock at $1\frac{5}{8}$ % discount, and sold it at $2\frac{3}{4}$ % premium, thereby gaining $437.50. What was the face value?

24. Exchanged 187 shares of stock at 110 for stock at 85. How many shares of the latter stock did I receive?

25. Exchanged 288 shares of insurance stock at $93\frac{3}{4}$ for canal stock at $112\frac{1}{2}$. How many shares of the latter stock did I receive?

26. The brokerage for buying 64 shares C. & R. I. R. R. stock was $40. What was the percent of brokerage?

27. A broker charged $55.20 for selling 92 shares mining stock. What was the rate of brokerage?

28. If gold is at a premium of 8 %, what is the value in currency of $1265 in gold?

29. If currency is at 7 % discount, what is the value in gold of $1750 in currency?

30. When gold is at a premium of $7\frac{1}{2}$ %, what is the value in gold of $4085 in currency?

31. When currency is at $6\frac{1}{4}$ % discount, what is the value in currency of $3240 in gold?

32. When gold is at a premium of $12\frac{1}{2}$ %, how much gold can be bought for $3960 in currency?

33. When currency is $7\frac{1}{2}$ % below par, what is the value in currency of $4070 in gold?

34. When a greenback dollar was worth only $62\frac{1}{2}$ cts. in gold, what was the price of gold?

35. When a dollar in currency was worth but $71\frac{3}{7}$ cts. in gold, what was the market value of gold?

36. If a currency dollar is worth $83\frac{1}{3}$ cts. in gold, what is the price of gold?

37. If $90\frac{10}{11}$ cts. in gold will buy a paper dollar, what is the premium on gold?

38. Bought 87 shares of stock at $97\frac{1}{2}$, and sold them at 103, brokerage $\frac{1}{2}$ % on each transaction. Find my gain.

39. Bought 74 shares of stock at $91\frac{3}{4}$, and sold them at 88, brokerage $\frac{1}{4}$ % on each transaction. Find my loss.

40. Bought 115 shares of stock at 3 % discount, and sold them at 5 % premium, brokerage $\frac{3}{8}$ % on each transaction. Find gain.

41. Bought 113 shares of stock at $2\frac{3}{4}$ % premium, and sold them at $3\frac{1}{2}$ % below par, brokerage $\frac{5}{8}$ % on each transaction. Find my loss.

42. How many shares of stock bought at $3\frac{1}{2}$ % discount, and sold at 4 % premium, brokerage $\frac{3}{4}$ % on each transaction, will yield a profit of $450?

43. How many shares of stock bought at $102\frac{7}{8}$, and sold at $98\frac{3}{4}$, brokerage $\frac{1}{2}$ % on each transaction, will cause a loss of $820?

44. How many shares of stock bought at $1\frac{3}{4}$ % discount, and sold at $4\frac{1}{2}$ % premium, brokerage $\frac{1}{2}$ % on each transaction, will yield a gain of $409.50?

45. Bought stock at $96\frac{3}{4}$, and sold it at $102\frac{1}{2}$, thereby gaining $327.75. How many shares ($50 each) had I?

46. Bought Pacific R. R. stock at $98\frac{1}{4}$, and sold it at $\$103\frac{3}{4}$, brokerage $\frac{1}{2}$ % on each transaction. If my gain was $418.50, how many shares had I?

47. Bought 69 shares of stock at 98, and immediately sold it, allowing $\frac{1}{2}$ % brokerage on each operation. If my gain was $414, what was the selling price?

48. Bought 84 shares of stock at 2 % premium, and then was obliged to sell it, allowing $\frac{3}{8}$ % brokerage on each operation. If I lost $315 by the transaction, at what price did I sell?

49. Bought stock at $98\frac{1}{4}$, and sold it at $102\frac{3}{4}$, brokerage $\frac{1}{2}$ % on each transaction. What was the face value, if I gained $73.50?

50. Bought bonds at 4 % discount, and sold them at a profit of $18\frac{3}{4}$ %. At what premium were they sold

51. Bought bonds at 12 % premium, and sold them at a loss of $12\frac{1}{2}$ %. At what discount were they sold?

52. Mr. A received \$59.50, or a brokerage of $1\frac{3}{4}$ %, for selling bank stock. How many shares (\$50 each) did he sell?

53. I bought stock at $2\frac{1}{2}$ % discount, and sold it at $1\frac{3}{4}$ % premium, thereby gaining \$531.25. What did I receive for it?

54. A speculator bought stock at $1\frac{1}{2}$ % premium, and sold it at $\frac{3}{4}$ % discount, thereby losing \$236.25. How much did he receive for it?

55. A broker sold a certain amount of gold, and remitted his principal \$14492.50. His brokerage, at $\frac{3}{5}$ %, was \$82.50. What was the price of gold?

56. My broker sells my gold, and remits me \$8857. His brokerage, at $\frac{4}{5}$ %, is \$68. At what price did the gold sell?

57. A broker sold a certain amount of gold, and returned to the owner \$14388.25. His brokerage, at $\frac{5}{8}$ %, was \$83.75. What was the market value of gold?

58. My broker sold my gold and sent me \$11156.25. His brokerage, at $\frac{3}{4}$ %, was \$78.75. Find price of gold?

59. A broker sold a certain amount of gold, and sent his principal \$14124.37$\frac{1}{2}$. His brokerage, at $\frac{3}{8}$ %, was \$50.62$\frac{1}{2}$. At what price did the gold sell?

60. A broker sold gold, and remitted \$12937.50 to the owner. His brokerage, at $\frac{1}{2}$ %, was \$62.50. What was the market value of gold?

## ARTICLE 178.

### Assessments and Dividends.

1. I paid an assessment of $3\frac{3}{4}\%$, or \$367.50, on my mining stock. How many shares did I own?

2. Mr. B owns 112 shares of steamboat stock. If the company declare a dividend of $6\frac{1}{4}\%$, payable in stock, how many shares will he then own?

3. Mr. A bought 135 shares of insurance stock. If a dividend of $6\frac{2}{3}\%$, payable in stock, be declared, how many shares will he then have?

4. A gas company declared a dividend of $7\frac{1}{2}\%$, or \$9427.50. What was the capital stock?

5. A telegraph company declared a dividend of $6\frac{3}{4}\%$, or \$5906.25. What was the amount of capital stock?

6. An insurance company has a capital of \$84750. Its gross earnings for the year are \$12056.25, and its expenses \$4852.50. What is the rate of dividend, and what will a stockholder receive who owns 25 shares?

7. The capital stock of a manufacturing company is \$78250 in fifty-dollar shares. The gross earnings for the year are \$14379.35, and the expenses \$5380.60. What dividend will a stockholder receive who holds 75 shares?

8. A street-car company declared a dividend of $8\frac{4}{5}\%$, or \$11308. What was the capital stock?

9. I own 108 shares of gas stock. If a dividend of $8\frac{1}{3}\%$ (payable in stock) be declared, how many shares will I then own?

10. A turnpike company has a capital stock of \$68400. Its gross earnings for the year are \$6880, and its expenses \$1750. What is the rate of dividend, and how much will a stockholder receive who owns 45 shares?

11. An insurance company has a capital of $75750, in fifty-dollar shares. Its gross earnings for the year are $8917.85, and its expenses $2857.85. What is the rate of dividend, and how much will a stockholder receive who owns 54 shares?

12. A manufacturing company's capital is $75000. In 1891 its gross earnings were $8720, and its expenses $3470. If Mr. A owned 36 shares, what was his dividend?

13. A mining company's stock is $126750, in fifty-dollar shares. In 1892 its gross earnings were $15210, and its expenses $4647.50. What dividend did Mr. B receive, who had 75 shares?

14. A steamboat company declared a dividend of $13125. If a stockholder, who owned 50 shares, received $375, what was the capital stock?

15. The capital stock of a telegraph company is $250000. In 1892 they declared a dividend of $21875. If Mr. Smith owned 48 shares, what was his dividend?

16. The capital stock of the Quincy National Bank is $150000. In 1893 the bank declared a dividend of $12750. If Mr. Robinson received $561, how many shares did he own?

17. Mr. Jones owned 44 shares of mining stock. The company made an assessment of $125000. If Mr. Jones' assessment was $550, what was the entire number of shares?

18. What assessment is made when the owner of 63 shares pays $125 more than the owner of 48 shares?

19. What assessment was made when the owner of 32 shares paid $120 less than the owner of 50 shares?

20. A $6\frac{3}{4}\%$ dividend being declared on 2500 shares of stock, $15660 was paid out. How much of unclaimed dividends remained?

21. A stock dividend of 10 % was declared, after which the president had 165 shares. How many did he own before the dividend was declared?

22. A manufacturing company has a capital stock of $175000. Mr. B, who owns 75 shares, receives a dividend of $937.50. What is the entire amount of dividend?

## Article 180.

### Stock Investments.

1. If I invest $12500 in 5 % bonds at par, what income will it yield?

2. If I invest $6825 in 5 % bonds at 105, what income will I receive?

3. If I invest $9945 in 5 % bonds at $97\frac{1}{2}$, what will be my income?

4. If a man pay $6873.75 for D. & M. 7 % stock at 105, brokerage $\frac{3}{4}$ %, what will his annual income be?

5. What income will I receive by investing $5107.50 in U. S. 5 % bonds at 13 % premium, brokerage $\frac{1}{2}$ %?

6. What income will be realized by investing $2919.75 in telegraph stock at $85\frac{1}{2}$, brokerage $\frac{3}{8}$ %, if it pays a dividend of $8\frac{3}{4}$ %?

7. What will be the annual income of a capitalist who invests $8016.25 in mining stock that pays a dividend of $7\frac{1}{2}$ %, if the stock is at 25 % discount, and the broker charges $\frac{5}{8}$ %?

8. If I pay $8909.75 for U. S. 5 % bonds at 113, brokerage $\frac{1}{2}$ %, how much yearly income will it yield?

9. What income will be derived by investing $14782.50 in U. S. 6 % bonds at 109, brokerage $\frac{1}{2}$ %?

10. If I invest $7503.75 in U. S. 5 % bonds at 103, brokerage $\frac{1}{2}$ %, what income will I receive?

11. Paid $2535.75 for C. & O. 5 % bonds at $3\frac{1}{2}$ % premium; what will my income be?

12. What income will be derived from investing $9887.50 in O. & M. 5 % bonds at 112½, brokerage ½ %?

13. If a man pay $4657.50 for U. S. 6 % bonds at 103, brokerage ½ %, what will his income be?

14. I invested $10920 in stock at 2½ % discount, and sold it at 3 % premium. Find my gain.

15. A capitalist bought 25 $1000-bonds, which paid 5 % per annum in gold. If gold was at 8 % premium, what was his income in currency?

16. What income in currency would a man receive by investing $5320 in U. S. 5 % bonds at 112, when gold is at 108?

17. What income in currency would I receive from an investment of $4125 in U. S. 6 % bonds at 10 % premium, when gold is at 107?

18. What income in currency would be realized by investing $6468.75 in U. S. 6 % bonds at 112, brokerage ½ %, when gold is at 105?

19. What income in currency would be realized from an investment of $17515 in U. S. 4 % bonds at 113, when gold is at 110?

20. What income in currency would be derived by investing $19180 in U. S. 3 % bonds at 109, brokerage ⅜ %, when gold is at 106?

21. Sold 160 shares of stock at 87½, and invested the money in 6 % stock at 80. What will be my annual income?

22. Sold 255 6 % bonds at 107, and invested the proceeds in 5 % bonds at 85. How much did I increase my income?

23. I had 250 7 % bonds, which I sold at 108, and invested the proceeds in 6 % bonds at 90. How much did I increase my income?

24. Mr. A had 190 U. S. 5 % bonds, which he sold

at 113, and invested the proceeds in $4\frac{1}{2}\%$ bonds at 95. How much was his income increased?

25. How much will a man increase or decrease his income by selling 150 shares of 5 % stock at $12\frac{1}{2}\%$ premium, and investing the proceeds in 4 % stock at 10 % discount?

26. Which is better, and how much per annum, to invest \$16200 in 8 % bonds at $112\frac{1}{2}$, or in 7 % bonds at 90?

27. Which is better, and how much per annum, to invest \$28800 in 10 % bonds at 150, or in 8 % bonds at 128?

28. Which is better, and by what percent, to buy $7\frac{1}{2}\%$ stock at 120, or $4\frac{1}{2}\%$ stock at 75?

29. Which is better, and by what percent, to buy 9 % stock at 125, or 6 % stock at 75?

30. Which is better, and how much per annum, to invest \$15000 in 10 % stock at 150, or in 8 % stock at 120?

31. Which is better, and how much per annum, to invest \$7728 in 5 % bonds at 84, or in 7 % bonds at 112?

32. How much more income will be received by investing \$8820 in 8 % bonds at 105, than in 6 % bonds at 98?

33. If I buy 6 % stock at 80, what percent will I make on the investment?

34. What percent on his investment will a man make who buys 5 % stock at 75?

35. What percent on the investment will 8 % stock bought at 125 yield?

36. If I invest my capital in 9 % stock at 108, what percent will it pay me?

37. At what price must I buy bonds yielding an annual income of 6 % to make 8 % on the investment?

38. What must be paid for bonds which pay 8% annually to make 6% on the investment?

39. What premium must be paid for 10 % bonds to make 8% on the investment?

40. At what discount should 7 % bonds be bought to make 8 % on the investment?

41. At what premium should 8 % bonds be bought to realize $6\frac{2}{3}$ % on the investment?

42. I invested $14766 in bonds at 7 % premium, and sold them at 10 % premium. Find my gain.

43. A speculator invested $17150 in bonds at 2 % discount, and sold them at $3\frac{1}{2}$ % discount. Find his loss.

44. A man invested $11130 in bonds at 6 % premium, and sold them at $3\frac{1}{3}$ % advance. Find his gain.

45. A speculator bought bonds for $8924 at 3 % discount, and sold them at 2 % decline. Find his loss.

46. Sold 135 6 % bonds at 96, and invested the money in 7 % bonds at 108. How much was my income increased?

47. What income in currency will a man receive by investing $7093.75 in U. S. 6 % bonds at 113, brokerage $\frac{1}{2}$ %, when gold is at 108?

48. What sum invested in U. S. 5 % bonds at 115, will yield an annual income of $1036 in currency, when gold is at 112?

49. What sum invested in U. S. 6 % bonds at 116 will yield an annual income of $1221 in currency, when gold is at 10 % premium?

50. What sum invested in U. S. 4 % bonds at 110, will produce an annual income of $1029 in currency, when gold is at 5 % premium?

51. What sum invested in U. S. 3 % bonds at 108, will yield an annual income of $715.50 in currency, when gold is at 106?

# INTEREST.

## Article 183.—Case I.

*Find the interest at* 6 % *of*

| | PRINCIPAL. | TIME. | |
|---|---|---|---|
| 1. | $420 | 1 yr. | 1 mo. 3 days. |
| 2. | $450 | 1 yr. | 7 mo. 10 days. |
| 3. | $440 | 2 yrs. | 5 mo. 15 days. |
| 4. | $540 | 2 yrs. | 7 mo. 21 days. |
| 5. | $580 | 3 yrs. | 4 mo. 27 days. |
| 6. | $660 | 1 yr. | 1 mo. 1 day. |
| 7. | $700 | 1 yr. | 0 mo. 15 days. |
| 8. | $720 | 2 yrs. | 2 mo. 2 days. |
| 9. | $740 | 3 yrs. | 3 mo. 3 days. |
| 10. | $750 | 1 yr. | 8 mo. 20 days. |
| 11. | $780 | 1 yr. | 6 mo. 25 days. |
| 12. | $792 | 2 yrs. | 3 mo. 5 days. |
| 13. | $840 | | 10 mo. 10 days. |
| 14. | $775 | | 6 mo. 12 days. |
| 15. | $680 | | 9 mo. 15 days. |
| 16. | $690 | | 11 mo. 20 days. |
| 17. | $760 | | 8 mo. 27 days. |
| 18. | $870 | | 7 mo. 10 days. |
| 19. | $920 | | 9 mo. 3 days. |
| 20. | $960 | | 5 mo. 21 days. |
| 21. | $972 | | 7 mo. 5 days. |
| 22. | $840 | | 1 mo. 13 days. |
| 23. | $540 | | 2 mo. 17 days. |
| 24. | $680 | | 3 mo. 3 days. |
| 25. | $660 | | 7 mo. 7 days. |

*Find the amount of*

| | | | | |
|---|---|---|---|---|
| 26. | $480 | 1 yr. | 1 mo. | 1 day. |
| 27. | $510 | 2 yrs. | 3 mo. | 2 days. |
| 28. | $560 | 3 yrs. | 0 mo. | 3 days. |
| 29. | $620 | | 1 mo. | 3 days. |
| 30. | $240 | | 4 mo. | 10 days. |
| 31. | $360 | | | 63 days. |
| 32. | $540 | | | 75 days. |
| 33. | $580 | | | 81 days. |
| 34. | $640 | | | 105 days. |
| 35. | $780 | | | 25 days. |
| 36. | $810 | | | 20 days. |
| 37. | $840 | | | 44 days. |
| 38. | $880 | | | 45 days. |
| 39. | $930 | | 11 mo. | 10 days. |
| 40. | $1020 | 2 yrs. | 2 mo. | 3 days. |
| 41. | $1140 | 1 yr. | 0 mo. | 9 days. |
| 42. | $1260 | 5 yrs. | 5 mo. | 10 days. |
| 43. | $1360 | 1 yr. | 2 mo. | 3 days. |
| 44. | $1470 | 2 yrs. | 1 mo. | 22 days. |
| 45. | $1560 | | 7 mo. | 13 days. |
| 46. | $1680 | | 9 mo. | 17 days. |
| 47. | $1740 | | 11 mo. | 19 days. |
| 48. | $1860 | | 10 mo. | 23 days. |
| 49. | $1920 | 7 yrs. | 7 mo. | 7 days. |
| 50. | $2160 | 1 yr. | 0 mo. | 5 days. |

## ARTICLE 184.

*Find the interest of*

| | PRINCIPAL. | TIME. | | RATE. |
|---|---|---|---|---|
| 1. | $455 | 3 yrs. | 4 mo. 6 days | 4 % |
| 2. | $520 | 2 yrs. | 4 mo. 24 days | $4\frac{1}{2}$ % |
| 3. | $320 | 1 yr. | 8 mo. 12 days | 5 % |
| 4. | $375 | 3 yrs. | 7 mo. 6 days | $5\frac{1}{2}$ % |

| | | | | | |
|---|---|---|---|---|---|
| 5. | $480 | 2 yrs. | 3 mo. | 3 days | 6 % |
| 6. | $550 | 1 yr. | 9 mo. | 18 days | $6\frac{1}{2}$ % |
| 7. | $650 | 2 yrs. | 8 mo. | 12 days | 7 % |
| 8. | $560 | 3 yrs. | 8 mo. | 24 days | $7\frac{1}{2}$ % |
| 9. | $625 | 1 yr. | 5 mo. | 12 days | 8 % |
| 10. | $750 | 2 yrs. | 2 mo. | 12 days | $8\frac{1}{2}$ % |
| 11. | $725 | 3 yrs. | 1 mo. | 18 days | 9 % |
| 12. | $640 | 1 yr. | 5 mo. | 3 days | 10 % |
| 13. | $420 | 2 yrs. | 7 mo. | 15 days | $3\frac{1}{3}$ % |
| 14. | $450 | 3 yrs. | 3 mo. | 6 days | $4\frac{1}{2}$ % |
| 15. | $540 | 1 yr. | 7 mo. | 24 days | 5 % |
| 16. | $650 | 2 yrs. | 7 mo. | 6 days | $5\frac{1}{2}$ % |
| 17. | $675 | 3 yrs. | 2 mo. | 12 days | $6\frac{1}{2}$ % |
| 18. | $685 | 2 yrs. | 10 mo. | 6 days | $6\frac{2}{3}$ % |
| 19. | $720 | 1 yr. | 9 mo. | 18 days | $6\frac{3}{4}$ % |
| 20. | $850 | 3 yrs. | 8 mo. | 12 days | 7 % |
| 21. | $880 | 2 yrs. | 6 mo. | 24 days | $7\frac{1}{2}$ % |
| 22. | $885 | 1 yr. | 11 mo. | 6 days | 8 % |
| 23. | $940 | 2 yrs. | 1 mo. | 6 days | $8\frac{1}{3}$ % |
| 24. | $950 | 3 yrs. | 4 mo. | 24 days | $8\frac{1}{2}$ % |
| 25. | $975 | 1 yr. | 10 mo. | 20 days | 9 % |
| 26. | $980 | 2 yrs. | 11 mo. | 21 days | 10 % |

*Find the amount of*

| | PRINCIPAL. | TIME. | | | RATE. |
|---|---|---|---|---|---|
| 27. | $1024 | 1 yr. | 7 mo. | 24 days | $3\frac{1}{3}$ % |
| 28. | $1075 | 2 yrs. | 7 mo. | 24 days | 4 % |
| 29. | $1080 | 1 yr. | 6 mo. | 12 days | $4\frac{1}{2}$ % |
| 30. | $1125 | 3 yrs. | 9 mo. | 18 days | 5 % |
| 31. | $1150 | 2 yrs. | 4 mo. | 24 days | $5\frac{1}{2}$ % |
| 32. | $1230 | 1 yr. | 11 mo. | 10 days | 6 % |
| 33. | $1250 | 3 yrs. | 7 mo. | 6 days | $6\frac{1}{2}$ % |
| 34. | $1284 | 2 yrs. | 3 mo. | 27 days | $6\frac{2}{3}$ % |
| 35. | $1325 | 1 yr. | 10 mo. | 12 days | $6\frac{3}{4}$ % |

| | | | | | |
|---|---|---|---|---|---|
| 36. | $1375 | 4 yrs. | 4 mo. | 24 days | 7 % |
| 37. | $1420 | 3 yrs. | 5 mo. | 18 days | $7\frac{1}{2}$ % |
| 38. | $1475 | 3 yrs. | 9 mo. | 9 days | 8 % |
| 39. | $1540 | 2 yrs. | 8 mo. | 12 days | $8\frac{1}{3}$ % |
| 40. | $1550 | 1 yr. | 9 mo. | 18 days | $8\frac{1}{2}$ % |
| 41. | $1560 | 3 yrs. | 7 mo. | 6 days | $8\frac{3}{4}$ % |
| 42. | $1650 | 2 yrs. | 10 mo. | 24 days | 9 % |
| 43. | $1780 | 1 yr. | 11 mo. | 12 days | 10 % |
| 44. | $1850 | 3 yrs. | 3 mo. | 18 days | $3\frac{1}{3}$ % |
| 45. | $1920 | 2 yrs. | 0 mo. | 9 days | 4 % |
| 46. | $1980 | | 8 mo. | 12 days | 5 % |
| 47. | $2040 | | 7 mo. | 15 days | 6 % |
| 48. | $2250 | | 9 mo. | 18 days | 7 % |
| 49. | $2275 | | 5 mo. | 21 days | 8 % |
| 50. | $2320 | | 6 mo. | 24 days | 9 % |
| 51. | $2480 | | 3 mo. | 27 days | 10 % |

## Article 185.—Case II.

*Find the time in the following:*

| | PRINCIPAL. | INTEREST. | RATE. |
|---|---|---|---|
| 1. | $350 | $15.40 | 4 % |
| 2. | $375 | $20.25 | $4\frac{1}{2}$ % |
| 3. | $420 | $27.30 | 5 % |
| 4. | $480 | $39.60 | 6 % |
| 5. | $560 | $60.76 | 7 % |
| 6. | $520 | $57.20 | $7\frac{1}{2}$ % |
| 7. | $575 | $75.90 | 8 % |
| 8. | $625 | $93.75 | $8\frac{1}{3}$ % |
| 9. | $620 | $77.50 | $6\frac{2}{3}$ % |
| 10. | $675 | $117.45 | 9 % |
| 11. | $680 | $142.80 | 10 % |
| 12. | $660 | $56.76 | 4 % |
| 13. | $725 | $131.95 | 8 % |

| | | | |
|---|---|---|---|
| 14. | $750 | $97.50 | 5 % |
| 15. | $780 | $131.43 | 6 % |
| 16. | $840 | $173.46 | 7 % |
| 17. | $850 | $214.20 | 8 % |
| 18. | $880 | $217.80 | $7\frac{1}{2}$ % |
| 19. | $950 | $145.35 | 4 % |
| 20. | $960 | $112.80 | $3\frac{1}{3}$ % |
| 21. | $990 | $113.85 | $6\frac{2}{3}$ % |

| | AMOUNT. | INTEREST. | RATE. |
|---|---|---|---|
| 22. | $1077.67 | $67.67 | 4 % |
| 23. | $1129.55 | $104.55 | $4\frac{1}{2}$ % |
| 24. | $1602.50 | $352.50 | 8 % |
| 25. | $1490.50 | $115.50 | 7 % |
| 26. | $1389 | $189 | 6 % |
| 27. | $1965.60 | $405.60 | $7\frac{1}{2}$ % |
| 28. | $1745.70 | $95.70 | 8 % |
| 29. | $1891.75 | $141.75 | 9 % |
| 30. | $2013.45 | $153.45 | 10 % |

## Article 186.—Case III.

*Find the rate in the following:*

| | PRINCIPAL. | INTEREST. | TIME. |
|---|---|---|---|
| 1. | $360 | $19.44 | 1 yr. 4 mo. 6 days. |
| 2. | $390 | $26.91 | 1 yr. 6 mo. 12 days. |
| 3. | $425 | $38.25 | 1 yr. 9 mo. 18 days. |
| 4. | $440 | $41.14 | 1 yr. 8 mo. 12 days. |
| 5. | $540 | $46.17 | 1 yr. 5 mo. 3 days. |
| 6. | $570 | $54.34 | 1 yr. 5 mo. 18 days. |
| 7. | $575 | $64.40 | 1 yr. 7 mo. 6 days. |
| 8. | $615 | $79.95 | 1 yr. 8 mo. 24 days. |
| 9. | $625 | $90 | 1 yr. 9 mo. 18 days. |
| 10. | $630 | $64.26 | 1 yr. 2 mo. 12 days. |

| | | | |
|---|---|---|---|
| 11. | $650 | $111.15 | 1 yr. 10 mo. 24 days. |
| 12. | $660 | $137.94 | 2 yrs. 2 mo. 12 days. |
| 13. | $685 | $157.55 | 2 yrs. 3 mo. 18 days. |
| 14. | $845 | $135.20 | 2 yrs. 4 mo. 24 days. |
| 15. | $855 | $128.25 | 2 yrs. 2 mo. 20 days. |
| 16. | $880 | $70.40 | 2 yrs. 4 mo. 24 days. |
| 17. | $900 | $93.60 | 2 yrs. 7 mo. 6 days. |
| 18. | $960 | $106.56 | 2 yrs. 5 mo. 18 days. |
| 19. | $990 | $133.65 | 2 yrs. 8 mo. 12 days. |
| 20. | $1000 | $159.50 | 2 yrs. 10 mo. 24 days. |

| | AMOUNT. | INTEREST. | TIME |
|---|---|---|---|
| 21. | $1305.36 | $195.36 | 2 yrs. 11 mo. 6 days. |
| 22. | $1522.08 | $262.08 | 3 yrs. 2 mo. 12 days. |
| 23. | $1636.80 | $316.80 | 3 yrs. 7 mo. 6 days. |
| 24. | $1835.70 | $385.70 | 3 yrs. 9 mo. 18 days. |
| 25. | $2016.30 | $456.30 | 3 yrs. 10 mo. 24 days. |
| 26. | $2099.52 | $479.52 | 3 yrs. 8 mo. 12 days. |
| 27. | $2244 | $484 | 3 yrs. 3 mo. 18 days. |
| 28. | $2434.74 | $574.74 | 3 yrs. 5 mo. 6 days. |
| 29. | $2568. | $648. | 3 yrs. 4 mo. 15 days. |
| 30. | $3000.84 | $960.84 | 3 yrs. 11 mo. 3 days. |

## ARTICLE 187.—CASE IV.

*Find the principal in the following :*

| | INTEREST. | TIME. | RATE. |
|---|---|---|---|
| 1. | $11.75 | 1 yr. 2 mo. 3 days | 4 % |
| 2. | $18.24 | 1 yr. 3 mo. 6 days | $4\frac{1}{2}$ % |
| 3. | $30 | 1 yr. 7 mo. 6 days | 5 % |
| 4. | $41.58 | 1 yr. 9 mo. 18 days | $5\frac{1}{2}$ % |
| 5. | $54.81 | 1 yr. 8 mo. 9 days | 6 % |
| 6. | $51.87 | 1 yr. 4 mo. 24 days | $6\frac{1}{2}$ % |
| 7. | $82.46 | 1 yr. 10 mo. 24 days | 7 % |

| | | | |
|---|---|---|---|
| 8. | $76.45 | 1 yr. 5 mo. 18 days | $7\frac{1}{2}$ % |
| 9. | $114.55 | 1 yr. 11 mo. 21 days | 8 % |
| 10. | $79.05 | 1 yr. 2 mo. 12 days | $8\frac{1}{2}$ % |
| 11. | $149.31 | 2 yrs. 1 mo. 6 days | 9 % |
| 12. | $173.47 | 2 yrs. 2 mo. 12 days | $9\frac{1}{2}$ % |
| 13. | $203.55 | 2 yrs. 3 mo. 18 days | 10 % |
| 14. | $273.54 | 2 yrs. 5 mo. 3 days | 12 % |
| 15. | $68.87 | 2 yrs. 4 mo. 12 days | 3 % |
| 16. | $82.74 | 2 yrs. 4 mo. 24 days | $3\frac{1}{2}$ % |
| 17. | $104.55 | 2 yrs. 6 mo. 18 days | 4 % |
| 18. | $126.36 | 2 yrs. 7 mo. 6 days | $4\frac{1}{2}$ % |
| 19. | $149.85 | 2 yrs. 8 mo. 12 days | 5 % |
| 20. | $180.95 | 2 yrs. 9 mo. 18 days | $5\frac{1}{2}$ % |
| 21. | $218.99 | 2 yrs. 11 mo. 27 days | 6 % |
| 22. | $296.01 | 3 yrs. 7 mo. 6 days | $6\frac{1}{2}$ % |
| 23. | $278.25 | 3 yrs. 1 mo. 24 days | $6\frac{2}{3}$ % |
| 24. | $318.78 | 3 yrs. 3 mo. 18 days | 7 % |
| 25. | $57.80 | 6 mo. 12 days | $7\frac{1}{2}$ % |
| 26. | $103.95 | 9 mo. 27 days | 8 % |
| 27. | $124.80 | 10 mo. 24 days | $8\frac{1}{3}$ % |
| 28. | $94.50 | 7 mo. 6 days | 9 % |
| 29. | $132.65 | 8 mo. 12 days | 10 % |
| 30. | $230.49 | 11 mo. 21 days | 12 % |

## ARTICLE 188.—CASE V.

*Find the principal in the following:*

| | AMOUNT. | TIME. | RATE. |
|---|---|---|---|
| 1. | $278.91 | 1 yr. 1 mo. 6 days | 3 % |
| 2. | $338.65 | 1 yr. 2 mo. 12 days | $3\frac{1}{2}$ % |
| 3. | $399.38 | 1 yr. 3 mo. 9 days | 4 % |
| 4. | $478.35 | 1 yr. 4 mo. 24 days | $4\frac{1}{2}$ % |
| 5. | $513.00 | 1 yr. 7 mo. 6 days | 5 % |
| 6. | $571.48 | 1 yr. 9 mo. 18 days | $5\frac{1}{2}$ % |

| | | | |
|---|---|---|---|
| 7. | $646.41 | 1 yr. 10 mo. 27 days | 6 % |
| 8. | $710.72 | 1 yr. 8 mo. 12 days | 6½ % |
| 9. | $775.80 | 2 yrs. 1 mo. 18 days | 7 % |
| 10. | $863.46 | 2 yrs. 3 mo. 6 days | 7½ % |
| 11. | $939.30 | 2 yrs. 7 mo. 24 days | 8 % |
| 12. | $1005.34 | 2 yrs. 4 mo. 24 days | 8½ % |
| 13. | $1099.06 | 2 yrs. 6 mo. 12 days | 9 % |
| 14. | $1171.05 | 2 yrs. 9 mo. 18 days | 9½ % |
| 15. | $1273.23 | 2 yrs. 10 mo. 24 days | 10 % |
| 16. | $1235.79 | 2 yrs. 2 mo. 12 days | 11 % |
| 17. | $1422.75 | 2 yrs. 11 mo. 15 days | 12 % |
| 18. | $1289.74 | 3 yrs. 1 mo. 6 days | 3 % |
| 19. | $1398.60 | 3 yrs. 3 mo. 18 days | 3⅓ % |
| 20. | $1469.31 | 3 yrs. 5 mo. 21 days | 4 % |
| 21. | $1564.65 | 3 yrs. 6 mo. 12 days | 4½ % |
| 22. | $1667.25 | 3 yrs. 4 mo. 24 days | 5 % |
| 23. | $1777.23 | 3 yrs. 9 mo. 18 days | 5½ % |
| 24. | $908.20 | 2 yrs. 7 mo. 6 days | 7½ % |
| 25. | $2015.00 | 3 yrs. 6 mo. 20 days | 6¾ % |

*Find the interest:*

| | AMOUNT. | TIME. | RATE. |
|---|---|---|---|
| 26. | $1927.36 | 3 yrs. 7 mo. 6 days | 6 % |
| 27. | $2165.50 | 3 yrs. 3 mo. 18 days | 6⅔ % |
| 28. | $1930.16 | 8 mo. 12 days | 7 % |
| 29. | $1952.06 | 7 mo. 6 days | 7½ % |
| 30. | $2150.55 | 9 mo. 9 days | 8 % |
| 31. | $2064.00 | 10 mo. 24 days | 8⅓ % |
| 32. | $2337.05 | 11 mo. 18 days | 9 % |
| 33. | $2479.50 | 10 mo. 15 days | 10 % |
| 34. | $2584.00 | 9 mo. 18 days | 11 % |
| 35. | $2604.35 | 6 mo. 9 days | 12 % |
| 36. | $1965.00 | 1 yr. 0 mo. 24 days | 4½ % |
| 37. | $1402.50 | 2 yrs. 0 mo. 12 days | 6 % |

| | | | |
|---|---|---|---|
| 38. | $2024.75 | 3 yrs. 0 mo. 27 days | 8 % |
| 39. | $1712.00 | 4 yrs. 0 mo. 18 days | $8\frac{1}{3}$ % |
| 40. | $3599.64 | 1 yr. 7 mo. 6 days | 5 % |

## Article 190.

## Compound Interest.

*Find the compound interest of*

| | PRINCIPAL. | TIME. | RATE. |
|---|---|---|---|
| 1. | $875 | 3 yrs. 7 mo. 15 days | 8 % |
| 2. | $864 | 3 yrs. 7 mo. 6 days | $8\frac{1}{3}$ % |
| 3. | $1000 | 3 yrs. 9 mo. 18 days | 10 % |
| 4. | $1080 | 3 yrs. 9 mo. 0 days | $3\frac{1}{3}$ % |
| 5. | $1562.50 | 3 yrs. 7 mo. 15 days | 4 % |
| 6. | $1600 | 4 yrs. 2 mo. 20 days | 5 % |
| 7. | $1350 | 3 yrs. 9 mo. 0 days | $6\frac{2}{3}$ % |
| 8. | $1250 | 3 yrs. 5 mo. 0 days | 8 % |
| 9. | $1382.40 | 4 yrs. 0 mo. 0 days | $8\frac{1}{3}$ % |
| 10. | $5000 | 4 yrs. 4 mo. 24 days | 10 % |
| 11. | $6000 | 3 yrs. 9 mo. 18 days | 5 % |

*Find the compound amount of*

| | | | |
|---|---|---|---|
| 12. | $810 | 3 yrs. 0 mo. 0 days | $3\frac{1}{3}$ % |
| 13. | $750 | 2 yrs. 7 mo. 15 days | 4 % |
| 14. | $1000 | 2 yrs. 10 mo. 20 days | $4\frac{1}{2}$ % |
| 15. | $800 | 3 yrs. 8 mo. 0 days | 5 % |
| 16. | $600 | 2 yrs. 8 mo. 10 days | 6 % |
| 17. | $675 | 2 yrs. 9 mo. 18 days | $6\frac{2}{3}$ % |
| 18. | $1200 | 2 yrs. 5 mo. 18 days | 7 % |
| 19. | $1600 | 2 yrs. 6 mo. 12 days | $7\frac{1}{2}$ % |
| 20. | $1250 | 3 yrs. 9 mo. 18 days | 10 % |

## ARTICLE 191.

### Annual Interest.

*Find the annual interest of*

| | PRINCIPAL. | TIME. | RATE. |
|---|---|---|---|
| 1. | $1000 | 3 yrs. 4 mo. 12 days | 3 % |
| 2. | $450 | 3 yrs. 7 mo. 6 days | $3\frac{1}{3}$ % |
| 3. | $750 | 3 yrs. 9 mo. 18 days | 4 % |
| 4. | $2000 | 3 yrs. 10 mo. 12 days | $4\frac{1}{2}$ % |
| 5. | $680 | 3 yrs. 10 mo. 24 days | 5 % |
| 6. | $1000 | 4 yrs. 4 mo. 24 days | $5\frac{1}{2}$ % |
| 7. | $625 | 4 yrs. 2 mo. 12 days | 6 % |
| 8. | $1260 | 4 yrs. 4 mo. 6 days | $6\frac{2}{3}$ % |
| 9. | $1500 | 4 yrs. 3 mo. 18 days | 7 % |
| 10. | $1350 | 4 yrs. 9 mo. 18 days | $8\frac{1}{3}$ % |

*Find the amount at annual interest of*

| | PRINCIPAL. | TIME. | RATE. |
|---|---|---|---|
| 11. | $880 | 3 yrs. 11 mo. 6 days | $7\frac{1}{2}$ % |
| 12. | $1250 | 3 yrs. 7 mo. 24 days | 8 % |
| 13. | $750 | 3 yrs. 6 mo. 20 days | 9 % |
| 14. | $875 | 4 yrs. 8 mo. 12 days | 10 % |
| 15. | $1750 | 4 yrs. 3 mo. 6 days | 12 % |
| 16. | $2250 | 4 yrs. 4 mo. 15 days | 4 % |
| 17. | $1200 | 4 yrs. 5 mo. 10 days | $4\frac{1}{2}$ % |
| 18. | $2560 | 4 yrs. 9 mo. 18 days | 5 % |
| 19. | $1728 | 3 yrs. 7 mo. 6 days | $8\frac{1}{3}$ % |
| 20. | $1750 | 4 yrs. 10 mo. 15 days | 8 % |

21. What is the exact difference between the compound interest and the annual interest of $1638.40 for 3 yrs. 4 mo. 24 days, at $6\frac{1}{4}$ %?

## Miscellaneous Problems in Interest.

1. Find the amount of $1840.75 from June 11, 1891, to February 5, 1894, at 8 %.

2. The interest of $960 for a certain time, at 5 %, was $129.60. How long was it loaned?

3. The interest of $780 from May 7, 1893, to November 25, 1894, was $84.63. What was the rate?

4. The interest of a sum of money, at 6 %, from January 11, 1892, to October 5, 1894, was $130.38. How much was borrowed?

5. Loaned Mr. A a certain sum of money at $7\frac{1}{2}$ %, July 13, 1891, and on January 1, 1894, he paid the amount due, which was $568.80. How much of this was interest?

6. Find the compound interest of $675 from February 4, 1893, to September 28, 1895, at 6 %.

7. A note of $1500 was dated February 2, 1890, due September 17, 1894, with interest at 8 %, payable annually. No interest having been paid, what was due on settlement?

8. What is the difference between the simple interest and the compound interest of $960, for 2 yrs. 7 mo. 6 days, at 5 %?

9. What is the difference between the simple interest and the annual interest of $1260 for 4 yrs. 7 mo. 6 days, at $8\frac{1}{3}$ %?

10. What is the difference between the compound interest and the annual interest of $1687.50, for 3 yrs. 10 mo. 24 days, at $6\frac{2}{3}$ %.

11. A man borrowed $1080 February 12, 1891, at $6\frac{2}{3}$ %, and on July 15, 1895, he paid the amount due. How much was it?

12. I loaned Mr. Smith $820 April 9, 1892, at 5 %. On settlement he paid me $930.70. What was the date of payment?

13. Mr. Brown borrowed $650, August 10, 1891, and on May 28, 1893, he paid the amount due, which was $731.90. What was the rate of interest?

14. I loaned Mr. Jones a sum of money July 7, 1893, at 8 %, and on November 22, 1896, he paid the interest due, which was $155.25. How much did I loan him?

15. A certain sum of money was borrowed February 13, 1892, at 7½ %, and on September 19, 1894, the amount, which was $908.20, was paid. What was the interest?

16. Find the compound interest of $750, from May 8, 1891, to October 20, 1894, at 5 %.

17. A note of $1400 was given March 23, 1893, payable December 11, 1897, with interest at 9 %. If annual interest was charged, what was due on settlement?

18. What is the difference between the simple interest and the annual interest of $1560 from June 12, 1890, to January 18, 1896, at 5 %?

19. What is the difference between the simple interest and the compound interest of $1250, from August 7, 1892, to March 22, 1895, at 8 %?

20. What is the difference between the annual interest and the compound interest of $1000, from January 9, 1891, to September 27, 1894, at 6 %?

21. A note for $333.33 was given November 29, 1893, with interest at 10 %, and on March 17, 1897, the amount was paid. How much was it?

22. A merchant borrowed $960, March 27, 1893, at 6 %, and on settlement paid $1147.68. When did he return the money?

23. A capitalist loaned $1785 September 4, 1893, and on November, 16, 1896, he received the amount due, which was $2213.40. What rate of interest did he charge?

24. A speculator borrowed a sum of money May 14,

1892, at $4\frac{1}{2}$ %, and on April 4, 1895, he paid the interest due, which was $72.15. How much did he borrow?

25. A man borrowed a certain sum of money May 11, 1888, at 6 %, and on February 2, 1890, he paid the amount due, which was $529.68. How much did he borrow?

26. Find the compound amount of $1562.50, from February 14, 1894, to September 29, 1897, at 4 %?

27. A note of $680 was given April 8, 1891, due July 23, 1895, with interest payable annually at 6 %. No interest having been paid, what was due at settlement?

28. What is the difference between the simple interest and the annual interest of $1275, from March 11, 1891, to October 17, 1895, at $6\frac{2}{3}$ %?

29. What is the difference between the simple interest and the compound interest of $1400, from May 13, 1892, to December 19, 1894, at 5 %?

30. What is the difference between the compound interest and the annual interest of $2592, from November 16, 1892, to September 4, 1896, at $8\frac{1}{3}$ %?

31. A speculator borrowed $1953 August 8, 1892, at 8 %, and paid the note in full June 2, 1895. How much did he pay?

32. The amount of $1280 for a certain time, at 9 %, was $1487.36. Find the time.

33. The amount of $660 for 2 yrs. 10 mo. 24 days was $765.27. What was the rate?

34. I loaned Mr. A a certain sum of money for 2 yrs. 7 mo. 6 days, at $7\frac{1}{2}$ %, and received $243.75 interest. How much did I loan him?

35. The amount for 3 yrs. 11 mo. 18 days, at 6 %, was $1083.25. What was the interest?

36. Find the compound amount of $960 for 2 yrs. 8 mo. 18 days, at 7 %.

37. Find the amount of a note of $750, dated January 25, 1893, due September 10, 1897, with interest at 8 %, payable annually.

38. Find the difference between the compound interest and the annual interest of $2400, for 3 yrs. 7 mo. 6 days, at 5 %.

39. A man borrowed $840 for 3 yrs. 7 mo. 24 days, at 8 %. What was due on settlement?

40. In what time, at 8 %, will $350 amount to $1594.20?

41. The amount of $850 for 1 yr. 4 mo. 24 days was $939.25. What was the percent?

42. The interest of a sum of money for 4 yrs. 6 mo. 18 days, at 5 %, was $113.75. Find the sum.

43. The amount of a certain principal for 1 yr. 9 mo. 18 days, at $7\frac{1}{2}$ %, was $1532.25. Find principal.

44. What would be the amount of $1920, for 2 yrs. 7 mo. 24 days, with compound interest, at 5 %.

45. Find the amount of $1500, for 4 yrs. 7 mo. 18 days, with interest at 7 %, payable annually?

46. Loaned a man $1560 February 9, 1893, and on October 21, 1896, he paid the amount due. If the rate of interest was $7\frac{1}{2}$ %, what was the amount?

47. The interest of $1050 for a certain time, at 8 %, was $138.60. Find the time.

48. At what rate percent will $1800 in 1 yr. 7 mo. 6 days gain $230.40 interest?

49. The interest of a sum of money for 1 yr. 11 mo. 21 days, at 4 %, was $118.50. Find principal.

50. I loaned a man a certain sum of money for 2 yrs. 5 mo. 12 days, at 6 %, and received on settlement $665.26 How much of this was interest?

51. Find the compound amount of $1500 for 3 yrs. 9 mo. 15 days, at 6 %.

52. Find the amount of $1200 for 3 yrs. 8 mo. 15 days, with interest, at 4 %, payable annually.

53. Find the difference between the annual interest and the compound interest of $875 for 3 yrs. 7 mo. 15 days, at 8 %.

54. Find the amount of $897.50 for 2 yrs. 2 mo. 12 days, at 7 %.

55. In what time, at 8 %, will $1650 amount to $1894.20?

56. The interest of $1675 for 2 yrs. 1 mo. 6 days was $351.75. What was the rate?

57. The interest for 3 yrs. 5 mo. 18 days, at $4\frac{1}{2}$ %, was $292.50. What was the principal?

58. The amount for 4 yrs. 18 days, at $6\frac{2}{3}$ %, was $2222.50. What was the interest?

59. Find the compound interest and amount of $1600 for 2 yrs. 7 mo. 15 days, at 8 %.

60. Find the annual interest of $1260 for 3 yrs. 9 mo. 21 days, at 5 %.

61. What is the difference between the simple interest and the compound interest of $880 for 3 yrs. 7 mo. 6 days, at 5 %?

62. A note of $230.75 was given July 12, 1893, with interest at $5\frac{1}{2}$ %. What was due on settlement, August 7, 1896?

63. A note of $540 was given June 5, 1894, at 4 %, and on settlement $604.02 was paid. What was the date of settlement?

64. A note of $640 was given January 9, 1895, and on August 21, 1898, the amount, which was $744.16, was paid. What was the rate of interest?

65. A note dated October 19, 1895, due June 12, 1897, yielded $41.51 interest. If the rate was 6 %, what was the face of the note?

66. A note dated September 27, 1896, due December 30, 1899, and bearing interest at 7 %, amounted to $2947.40. For what sum was the note given?

67. Find the compound amount of $1250 for 2 yrs. 10 mo. 24 days, at 8 %.

68. Find the amount of $1800 for 4 yrs. 6 mo. 24 days, with interest at 8 %, payable annually.

69. A note for $1600 was given May 12, 1892, with interest, at 7½ %, payable annually. No interest having been paid, what was due on settlement, August 18, 1896?

70. Find the exact difference between the compound interest and the annual interest of $1000 for 3 yrs. 9 mo. 18 days, at 5 %.

## Article 192.

### Partial Payments.

1. A note of $850 was dated May 25, 1888. Interest 6 %. Indorsed August 13, 1889, $50; November 7, 1890, $324.95. What was due March 25, 1891?

2. A note of $750 was dated February 9, 1890. Interest 6 %. Indorsed June 21, 1891, $50; October 15, 1892, $220.75. What was due June 3, 1893?

3. A note of $1240 was dated May 6, 1890. Interest 6 %. Indorsed July 27, 1891, $131.14; October 15, 1892, $87.60. What was due August 24, 1893?

4. A note of $1250 was dated January 25, 1889. Interest 8 %. Indorsed March 10, 1891, $462.50; August 4, 1892, $100; May 22, 1894, $556. What was due on settlement, January 1, 1895?

5. A note of $750 was dated June 12, 1889. Interest 8 %. Indorsed October 18, 1890, $131; January 27, 1892, $321.40. What was due June 12, 1893?

6. A note of $550 was dated February 5, 1887.

Interest 6 %. Indorsed October 17, 1888, $66.10; March 5, 1890, $40. What was due November 11, 1892?

7. A note of $720 was dated June 10, 1887. Interest 8 %. Indorsed October 25, 1888, $219.20; July 7, 1890, $60; May 13, 1891, $308.32. What was due December 1, 1892?

8. A note of $1250 was dated March 4, 1888. Interest 6 %. Indorsed July 28, 1889, $155; October 10, 1890, $286.40; November 28, 1891, $468. What was due July 4, 1892?

9. A note of $750 was dated September 11, 1887. Interest 5 %. Indorsed November 23, 1888, $245; June 29, 1889, $166.50; April 17, 1890, $116. What was due September 11, 1891?

10. A note of $640 was dated January 1, 1887. Interest 8 %. Indorsed February 16, 1888, $77.60; October 1, 1888, $151; February 16, 1890, $55; March 4, 1891, $167. What was due January 19, 1892?

11. A note of $1250 was dated February 9, 1887. Interest 6 %. Indorsed September 15, 1888, $170; November 27, 1889, $286.40; December 30, 1890, $465.50. What was due March 12, 1892?

12. A note of $980 was dated March 9, 1888. Interest 8 %. Indorsed April 24, 1889, $168.20; November 12, 1890, $100; November 30, 1891, $387.20. What was due August 21, 1892?

13. A note of $2000 was dated December 12, 1889. Interest 6 %. Indorsed June 19, 1891, $100; December 6, 1891, $338; August 21, 1892, $276.50; May 12, 1893, $60.34. What was due October 15, 1894?

14. A note of $1080 was dated January 25, 1889. Interest 5 %. Indorsed March 1, 1890, $364.40; May 13, 1891, $341.50; September 1, 1892, $20.80. What was due on settlement, January 25, 1893?

**15.** A note of $580 was dated June 12, 1887. Interest 7½ %. Indorsed July 6, 1888, $76.40; May 18, 1889, $125.75; August 24, 1890, $123.70. What was due March 6, 1892?

**16.** A note of $625 was dated April 19, 1886. Interest 4½ %. Indorsed February 7, 1887, $122.50; January 13, 1888, $20; March 25, 1889, $25; April 19, 1890, $280.60. What was due October 7, 1891?

**17.** A note of $1120 was dated August 7, 1886. Interest 7 %. Indorsed September 13, 1887, $76.24; November 7, 1888, $79.08; September 13, 1889, $457.72. What was due August 7, 1890?

**18.** A note of $580 was dated October 17, 1886. Interest 5 %. Indorsed August 5, 1888, $52.20; April 17, 1890, $49.30; August 5, 1891, $387.70. What was due June 29, 1892?

**19.** A note of $720 was dated May 21, 1887. Interest 6 %. Indorsed July 6, 1888, $45; July 27, 1889, $45; June 30, 1890, $324.28. What was due May 9, 1891?

**20.** A note of $1040 was dated December 11, 1887. Interest 7½ %. Indorsed May 5, 1889, $289.20; August 11, 1890, $75; July 17, 1891, $50. What was due May 5, 1893?

**21.** A note of $660 was dated February 17, 1887. Interest 7 %. Indorsed January 11, 1888, $40; October 29, 1888, $30; January 11, 1890, $273.98. What was due August 17, 1891?

**22.** A note of $550 was dated July 22, 1887. Interest 8 %. Indorsed November 10, 1888, $157.20; July 22, 1890, $161.20; October 4, 1891, $133.60. What was due May 10, 1892?

**23.** A note of $2400 was dated March 7, 1888. Interest 10 %. Indorsed August 19, 1889, $248; April 4,

1890, $100; May 28, 1891, $176; March 16, 1892, $1342. What was due November 28, 1893?

**24.** A note of $720 was dated June 10, 1887. Interest 8 %. Indorsed October 25, 1888, $219.20; July 7, 1890, $60; May 13, 1891, $308.32. What was due December 1, 1892?

**25.** A note of $1860 was dated July 13, 1890. Interest 10 %. Indorsed November 19, 1891, $561.10; May 1, 1893, $814.75; February 19, 1894, $75. What was due July 4, 1894?

**26.** A note of $2000 was dated June 14, 1887. Interest 5 %. Indorsed July 20, 1888, $460.00; April 2, 1889, $50; July 20, 1890, $515; June 14, 1891, $406.25. What was due August 24, 1893?

**27.** A note of $1500 was dated May 11, 1885. Interest 6 %. Indorsed February 14, 1886, $50; September 23, 1887, $100; July 8, 1889, $100; May 29, 1891, $150. What was due September 4, 1893?

**28.** A note of $1200 was dated April 17, 1886. Interest $7\frac{1}{2}$ %. Indorsed November 23, 1886, $50; February 5, 1888, $112; July 29, 1889, $100; March 17, 1890, $290.50. What was due November 17, 1892?

# DISCOUNT.

## ARTICLE 196.

### Bank Discount.

CASE I.—WHEN THE NOTE DOES NOT BEAR INTEREST.

*Find the date when due, bank discount, and proceeds of*

1. A note of $480, dated January 5, 1888, due in 90 days, and discounted at 6 %?

2. A note of $550, dated June 19, 1889, due in 5 mo., and discounted at 8 %.

3. A note of $570, dated March 15, 1890, due in 6 mo., and discounted at 6 %, June 26, 1890.

4. A note of $850, dated May 1, 1889, payable in 6 mo., and discounted July 25, 1889, at 6 %.

5. A note of $740, dated January 4, 1890, payable in 5 mo., and discounted February 19, 1890, at 7 %.

6. A note of $1275 was dated January 13, 1892, payable in 4 mo., and discounted February 10, 1892, at $4\frac{1}{2}$ %. What were the proceeds?

7. A note of $1350 was dated October 19, 1891, payable in 5 mo., and discounted December 14, 1891, at 4 %. Find the proceeds.

8. A note of $1440 was dated August 15, 1891, due in 9 mo., and discounted January 31, 1892, at 5 %. What were the proceeds?

9. A note of $1560 was dated July 21, 1890, due in 1 yr., and discounted March 14, 1891, at $7\frac{1}{2}$ %. What were the proceeds?

10. A note of $350 was dated April 7, 1889, due in 10 mo., and discount[ed] November 21, 1889, at 8 %. What were the proceeds?

11. A note of $1440 was dated April 13, 1892, payable in 7 mo., and discounted August 12, 1892, at 6 %. Find the proceeds.

12. A note of $1625 was dated March 6, 1889, payable in 5 mo., and discounted May 2. 1889, at 8 %. What were the bank discount and the proceeds?

13. A dealer bought 450 bls. of flour, at $5.20 a barrel, and sold it at $6 a barrel, taking in payment a sixty-day note, which he immediately discounted in bank at 6 %. Find his gain on the transaction.

14. A speculator bought 250 bls. of pork, at $16.80 a barrel. He sold it at $18 a barrel, taking in payment a note at 5 mo., which he at once discounted in bank at 8 %. Find his gain by the operation.

15. A wholesale merchant bought 240 bls. of flour, at $5.50 a barrel. He sold it at $6.75 a barrel, taking in payment a ninety-day note, which he forthwith discounted in bank at 6 %. How much did he make on the flour?

16. A planter sold 240 bls. of sugar, of 225 lb. each, at 5 cts. a pound. He received in payment a note at 30 days, which he immediately discounted in bank at 6 %. What were the proceeds of the note?

17. A contractor bought 720 bls. of flour, at $5.20 a barrel. He sold it at $6.25 a barrel, receiving in payment a ninety-day note, which he at once discounted in bank at 6 %. What did he make on the transaction?

18. Bought 340 tons of hay, at $13 a ton, and sold it at $16 a ton, taking in payment a ninety-day note, which I forthwith discounted in bank at 6 %. Find my gain by the operation.

19. A speculator bought 160 bls. of beef, at $18.75 a barrel, and sold it at $22.50 a barrel, receiving in payment a sixty-day note, which he discounted in bank the same day at 8 %. What was his profit?

**20.** A trader bought 550 cords of wood, at $4.80 a cord. He sold it at $5.60 a cord, taking in payment a forty-five-day note, which he immediately discounted in bank at 9 %. Find his gain.

**21.** A contractor bought 750 bls. of flour, at $5.75 a barrel, and sold it at $6.80 a barrel, receiving in payment a sixty-day note, which he discounted in bank at 8 % on the day of sale. What was his profit?

**22.** $1050.00.

WYOMING, OHIO, June 24, 1892.

Eight months after date, I promise to pay to James Clinton, or order, One Thousand and Fifty Dollars, for value received. JOHN SWIFT.

Discounted December 8, 1892, at 4 %. Find proceeds.

**23.** $1250.00.

CHICAGO, ILL., May 9, 1892.

One year after date, I promise to pay Robert Stuart, or order, Twelve Hundred and Fifty Dollars, for value received. ARTHUR ELLIOTT.

Discounted January 12, 1893, at $7\frac{1}{2}$ %. What were the proceeds?

**24.** $1500.

LOUISVILLE, KY., September 12, 1891.

Six months after date, I promise to pay Wm. King, or bearer, Fifteen Hundred Dollars, for value received. ARTHUR MOORE.

Discounted Dec. 10, 1891, at 5 %. Find proceeds.

**25.** $537.50.

COLUMBUS, O., December 9, 1891.

Five months after date, I promise to pay Donald Grant, or order, Five Hundred Thirty-seven and $\frac{50}{100}$ Dollars, for value received. EUGENE ST. CLAIR.

Discounted Feb. 6, 1892, at $7\frac{1}{2}$ %. Find proceeds.

WHEN THE NOTE BEARS INTEREST.

*Find the bank discount and proceeds of*

26. A note of $500, dated September 7, 1887, due in 8 mo., and bearing interest at 8 %, discounted in bank February 10, 1888, at 4 %.

27. A note of $1875, dated March 24, 1890, due in 8 mo., and bearing interest at 8 %. Discounted in bank August 23, 1890, at 6 %.

28. A note of $1000 was dated March 10, 1891, due in 6 mo. and bearing interest at 6 %, discounted in bank July 3, 1891, at 8 %. Find proceeds.

29. A note of $2000 dated May 3, 1889, payable in 6 mo., and bearing interest at 6 %, was discounted in bank September 27, 1889, at 9 %. What were the proceeds?

30. A note of $1200, dated February 13, 1891, due in 9 mo., and bearing interest at 6 %, was discounted in bank July 31, 1891, at 8 %. What were the proceeds?

31. A note of $1000, dated June 11, 1891, due in 11 mo., and bearing interest at 8 %, was discounted in bank January 27, 1892, at 5 %. Find bank discount and proceeds.

32. A note of $650, dated August 7, 1890, due October 16, 1891, and bearing interest at 5 %, was discounted in bank July 21, 1891, at 4 %. What were the proceeds?

33. A note of $500, dated November 16, 1891, due April 7, 1893, and bearing interest at $7\frac{1}{2}$ %, was discounted in bank January 28, 1893, at 10 %. Find bank discount and proceeds.

34. A note of $400, dated January 2, 1891, due October 17, 1892, and bearing interest at 10 %, was discounted in bank July 22, 1892, at 6 %. Find bank discount and proceeds.

35. A note of $600, dated March 5, 1892, due No-

vember 12, 1892, and bearing interest at 6 %, was discounted in bank October 1, 1892, at 8 %. What were the proceeds?

36. $1200.

BOSTON, MASS., October 9, 1891.

Eight months after date, I promise to pay Samuel Kennedy, or order, Twelve Hundred Dollars, with interest at 10 % for value received.

ALBERT G. RODNEY.

Discounted February 25, 1892, at 10 %. What were the proceeds?

37. $750.

ROCHESTER, N. Y., July 5, 1890.

Eleven months after date, for value received, I promise to pay R. M. Woodruff, or bearer, Seven Hundred and Fifty Dollars, with interest at 8 %.

CECIL HOWARD.

Discounted January 15, 1891, at 5 %. Find proceeds.

38. $2000.00.

PHILADELPHIA, PA., May 29, 1890.

One year after date I promise to pay Sherman Lester, or bearer, Two Thousand Dollars, with interest at 6 %, for value received.

WM. H. BRADFORD.

Discounted February 13, 1891, at 7 %. Find the proceeds.

39. $1500.00.

CINCINNATI, OHIO, June 11, 1892.

Five months after date I promise to pay George Clark, or order, Fifteen Hundred Dollars, with interest at 8 %, for value received.

ALLEN RAYMOND.

Discounted July 29, 1892, at $6\frac{2}{3}$ %. Find bank discount and proceeds.

40. $1750.00.

St. Louis, Mo., January 1, 1893.

On the 10th day of July, 1893, for value received, we promise to pay to the order of Henry Du Bois, Seventeen Hundred and Fifty Dollars, with interest at $7\frac{1}{2}\%$.

Edwin Cameron.
Simon Weatherby.

Discounted April 14, 1893, at 10 %. Find bank discount and proceeds.

41. $750.00.

Boston, Mass., December 21, 1892.

Five months after date, I promise to pay James Clifford, or bearer, Seven Hundred and Fifty Dollars, with interest at 8 %, for value received.

Geo. W. Anderson.

Discounted March 13, 1893, at 10 %. Find the proceeds.

42. $1200.00.

Springfield, Ill., November 5, 1891.

Six months after date, I promise to pay Robert Morris, or order, Twelve Hundred Dollars, with interest at 6 %, for value received. Henry Knox.

Discounted February 26, 1892, at $7\frac{1}{2}\%$. Find the proceeds.

43. $720.00.

Cleveland, Ohio, October 15, 1892.

On the 6th day of September, 1893, we promise to pay Israel Ludlow, or order, Seven Hundred and Twenty Dollars, with interest at $6\frac{2}{3}\%$, for value received.

Henry Du Bois.
Lewis P. Sayre.

Discounted May 24, 1893, at $8\frac{1}{8}\%$. Find proceeds.

## ARTICLE 197.—CASE II.

### To Find the Face of the Note.

1. The proceeds of a note due in 5 mo., and discounted in bank at 8 %, were $531.30. What was the face of the note?

2. I wish to obtain $474.96 from a bank. For what sum due 60 days hence must I give my note, that, when discounted in bank at 6 %, it may yield that sum?

3. The proceeds of a note due in 105 days, and discounted in bank at 7 %, were $362.23. What was the face of the note?

4. The proceeds of a note due in 4 mo., and discounted in bank at 6 %, were $1224.37½. For what sum was the note drawn?

5. A bank paid $869.22 for a sixty-day note after discounting it at 7 %. What was the bank discount?

6. The avails of a five-month note that had been discounted in bank at 10 % were $1187.30. What did the bank charge for discounting?

7. The proceeds of a forty-five-day note that had been discounted in bank at 7½ % were $549.45. What was the bank discount?

8. I desire to use $912.87 for 5 mo. For what sum must I give my note to a bank to receive the above amount if the rate of discount is 8 %.

9. A bank paid $1723.92 for a four-month note, after discounting it at 6 %. What was the face of the note?

10. I wish to borrow $1552.95 from a bank. For what sum due 60 days hence must I give my note to receive that sum if the bank discounts it at 8 %.

11. A bank paid $603.75 for a five-month note which had been discounted at 8 %. For what sum was the note drawn?

12. The proceeds of a note due in 3 mo. and discounted in bank at 6 % were $826.98. What was the face of the note?

13. I wish to use $1611.30 for 2 mo. For what sum must I give my note, that, when discounted in bank at 10 %, I shall receive that amount?

14. I bought a bill of goods amounting to $1336.50; gave in payment a note at 69 days, which was discounted in bank at 5 %. What was the face of the note?

15. Sold a lot of wheat at $1.25 a bushel, and took in payment a note at 99 days, which I immediately discounted in bank at 6 %. The proceeds of the note were $1228.75. How many bushels were sold?

16. A stock-dealer bought 42 horses, and gave his note at 60 days in payment. The proceeds of this note were $3127.95. If the rate of discount was 4 %, what was the average price per head of the horses?

17. A speculator bought 10 village lots, and gave a five-month note in payment. This note was immediately discounted in bank at 10 %, and the bank discount was $204. What was the average price of the lots?

18. A planter sold 120 bls. of sugar, taking in payment a note at 105 days, which he discounted in bank the same day at 7 %. The proceeds of the note were $1468.50. At what price per barrel did the sugar sell?

19. A note dated May 9, 1891, due September 21, 1892, and bearing interest at 8 %, was discounted in bank June 26, 1892, at 6 %. The proceeds were $874.68. What was the face of the note?

20. A note dated January 18, 1891, due August 21, 1892, and bearing interest at 5 %, was discounted in bank May 20, 1892, at $7\frac{1}{2}$ %. The proceeds were $608.58. For what amount was the note drawn?

21. A note dated June 12, 1895, due in 9 mo., and

bearing interest at 6 %, was discounted in bank January 3, 1896, at 5 %. The proceeds were $2070.09. What was the face of the note?

22. A note dated May 13, 1893, due February 26, 1895, and bearing interest at 4 %, was discounted in bank November 13, 1894, at $6\frac{2}{3}$ %. The proceeds were $656.60. For what sum was the note drawn?

23. A speculator bought a certain number of barrels of pork, each containing 200 lb., at $6\frac{2}{3}$ cts. a pound. He sold it at 8 cts. a pound, taking in payment a note at 105 days, which he immediately discounted in bank at $7\frac{1}{2}$ %. The proceeds of this note were $5865. What was his net gain on the transaction?

## Article 199.

### True Discount.

1. Find the present worth and discount of a debt of $1152.45, due in 2 yrs. 7 mo. 6 days, money being worth 7 %.

2. Of a note of $1262.80, due in 2 yrs. 10 mo. 24 days, money worth 8 %.

3. Of a note of $590.20, due in 1 yr. 9 mo. 18 days, money being worth $7\frac{1}{2}$ %.

4. Of a note of $818.64, due in 2 yrs. 3 mo. 12 days, money being worth 6 %.

5. What is the present worth of a debt of $610.20, due in 1 yr. 7 mo. 6 days, money worth 5 %.

6. What is the true discount of a note for $1351.25, payable in 1 yr. 10 mo. 15 days, money worth 8 %?

7. What is the present worth of a debt of $1295, payable in 9 mo. 18 days, money worth $4\frac{1}{2}$ %?

8. Find the present worth of $765, due in 2 yrs. 2 mo. 20 days, money worth 6 %.

9. Find the true discouut of $1573.25, due in 1 yr. 8 mo. 12 days, money worth 5 %?

10. What is the true discount of $1039.35, payable in 2 yrs. 3 mo. 18 days, money worth 10 %?

11. What is the difference between the interest and the discount of $903 for 2 yrs. 6 mo. 18 days, at 8 %?

12. What is the difference between the interest and the discount of $1659 for 1 yr. 9 mo. 6 days, at 6 %?

13. What is the difference between the interest and the discount of $746.20, for 2 yrs. 5 mo. 18 days, at 6 %?

14. Find the difference between the interest and the discount of $966 for 1 yr. 8 mo. 24 days, at 6 %.

15. Find the difference between the interest and the discount of $1072.50 for 2 yrs. 4 mo. 24 days, at 6 %.

16. Find the difference between the interest and the discount of $1190 for 2 yrs. 4 mo. 15 days, at 8 %.

17. Find the present worth of a debt of $939.60, of which $\frac{1}{3}$ is to be paid cash, $\frac{1}{3}$ in 1 yr., and the remainder in 2 yrs., money being worth 8 %.

18. A note for $1593.90, of which $\frac{1}{3}$ was payable in 1 yr., $\frac{1}{3}$ in 2 yrs., and the remainder in 3 yrs., was sold for its present worth at 5 %. What was received for it?

19. Find the present worth, at 10 %, of $3465, of which $\frac{1}{3}$ is to be paid cash, $\frac{1}{3}$ in 6 mo., and the remainder in 1 yr.

20. A man owed a debt of $1263.60, of which $\frac{1}{3}$ was payable in cash, $\frac{1}{3}$ in 8 mo., and the balance in 16 mo. If money was worth 6 %, what was the cash value of the entire debt?

21. I bought a bill of goods amounting to $1479, and was offered 5 % off for cash, or 3 mo. time without interest. If money was worth 8 %, how much did I gain by paying cash?

22. A contractor bought lumber for $1606.80, and

was offered 5 % discount for cash, or 4 mo. time without interest. If money was worth 9 %, how much did he gain by paying cash?

23. A speculator bought a farm for $1855, and was offered 7 % discount for cash, or 9 mo. time without interest. If money was worth 8 %, what did he gain by paying cash?

24. Which is better, and how much, to buy a house worth $1560, at 6 % discount for cash, or on 8 mo. time without interest, money being worth 6 %?

25. Which is better, and how much, to buy a farm worth $2520, at $3\frac{1}{3}$ % discount for cash, or on 9 mo. time without interest, money being worth $6\frac{2}{3}$ %?

26. A note of $840, dated February 1, 1891, due September 16, 1893, and bearing interest at 8 %, was disposed of for its present worth at 6 %, January 16, 1892. What were the present worth and the discount?

27. A note of $545, dated June 5, 1890, due March 23, 1893, and bearing interest at 10 %, was sold for its present worth at 8 %, February 8, 1892. What were the present worth and the discount.

28. A note of $804, dated April 8, 1889, due February 28, 1892, and bearing interest at $4\frac{1}{2}$ %, was disposed of for its present worth at 6 %, December 16, 1890. What were the present worth and the discount?

29. A note of $1350, dated May 10, 1890, due September 25, 1893, and bearing interest at 8 %, was sold for its present worth at 5 %, February 19, 1892. What were the present worth and the discount?

30. A note of $1357, dated July 5, 1891, due February 11, 1895, and bearing interest at 5 %, was disposed of for its present worth at 8 %, March 26, 1893. What were the present worth and the discount?

31. A note of $1624, dated November 16, 1892, due

June 6, 1896, and bearing interest at $4\frac{1}{2}\%$, was sold for its present worth at $5\%$, January 12, 1894. What were the present worth and the discount?

*Omitting the days of grace, find the difference between the true discount and the bank discount of*

32. A note of $1070, due in 1 yr. 4 mo. 24 days, at $5\%$.

33. A note of $5770, due in 2 yrs. 6 mo. 24 days, at $6\%$.

34. A note of $813, due in 1 yr. 4 mo. 24 days, at $6\%$.

35. A note of $1905, due in 3 yrs. 4 mo. 15 days, at $8\%$.

36. A note of $2414, due in 1 yr. 8 mo. 12 days, at $8\%$.

37. A note of $1340, due in 1 yr. 7 mo. 6 days, at $4\frac{1}{2}\%$.

38. A note of $1635, due in 1 yr. 2 mo. 12 days, at $7\frac{1}{2}\%$.

39. A note of $997.50, due in 1 yr. 6 mo. 20 days, at $9\%$.

40. A note of $1180, due in 1 yr. 9 mo. 18 days, at $10\%$.

41. A note of $700, due in 2 yrs. 4 mo. 24 days, at $5\%$.

## Article 201.

### Domestic Exchange.

1. Exchange being at $\frac{2}{5}\%$ premium, what must be paid for a draft on Chicago for $1850?

2. What will be the cost of a bill of exchange on New Orleans for $1560, at $\frac{5}{8}\%$ discount?

3. What must be paid for a sight draft on Boston for $1750, if exchange is at $\frac{7}{10}$ % premium?

4. Find the cost of a sight draft on San Francisco for $2240, exchange being at $\frac{3}{8}$ % discount.

5. What must be the face of a bill of exchange on Kansas City that cost $1693.44, at $\frac{4}{5}$ % premium?

6. The cost of a draft on Baltimore was $1932.45. If exchange was at $\frac{9}{10}$ % discount, what was the face of the draft?

7. $1449 was paid for a sight draft on Buffalo, at $\frac{5}{8}$ % premium. What was the face of the draft?

8. At $\frac{3}{5}$ % discount, $1366.75 was paid for a sight draft on Brooklyn. What was the face of the draft?

9. The cost of a sight draft on Charleston for $2040 was $2024.70. What was the rate of exchange?

10. I paid $1253.75 for a draft on Milwaukee for $1250. What percent was the premium?

11. A draft on Cleveland for $1098 cost $1092.51. What was the rate of discount?

12. A traveler paid $1182.05 for a sight draft on Montpelier for $1175. What was the rate of exchange?

13. What must be paid for a bill of exchange on Minneapolis for $1400, payable in 45 days, exchange being at par, and interest 6 %?

14. What will be the cost of a sixty-day draft on Mobile for $975, exchange at par, and interest 8 %?

15. I paid $1312.74 for a thirty-day draft on Detroit. If exchange was at par, and interest 6 %, what was the amount of the draft?

16. The cost of a ninety-day draft on Galveston was $866.36. If exchange was at par, and interest at 6 %, what was the face of the draft?

17. Find the cost of a draft on Louisville for $1200, payable in 33 days, exchange at $\frac{1}{4}$ % premium, and interest 5 %.

18. What must be paid for a bill of exchange on Richmond for $740, payable in 42 days, exchange being at $\frac{1}{2}$ % discount, interest 8 %?

19. I wish to purchase a draft on Indianapolis for $1200, payable in 57 days. What must I pay for it if exchange is $\frac{3}{8}$ % premium, and interest $7\frac{1}{2}$ %?

20. Find the cost of a draft on Savannah for $960, due in 60 days, exchange being at $\frac{2}{5}$ % discount, and interest 8 %.

21. I paid $825.30 for a draft on Rochester, due in 93 days, exchange $\frac{1}{4}$ % premium, and interest $7\frac{1}{2}$ %. For what sum was the draft drawn?

22. The cost of a ninety-day draft on Bangor was $475.44. If exchange was at $\frac{3}{5}$ % premium, and interest 6 %, what was the face of the draft?

23. A bill of exchange on Philadelphia, payable in 69 days, cost the purchaser $732.75. If exchange was at $\frac{4}{5}$ % discount, and interest $7\frac{1}{2}$ %, what was the face?

24. A traveler paid $1241.25 for a 60-day draft on Denver. Exchange being at $\frac{7}{10}$ % premium, and interest 8 %, what was the face of the draft?

25. $1024.40 was paid for a draft on Atlanta, due in 87 days. If exchange was at $\frac{1}{2}$ % discount, and interest 4 %, what was the face of the draft?

26. Exchange being at $\frac{3}{4}$ % premium, what must be paid for a sight draft on Pittsburgh for $720.

27. Exchange being at $\frac{9}{10}$ % discount, what must be paid for a sight draft on Columbus for $550?

28. Exchange being at par, what must be paid for a forty-five-day draft on Nashville, if the rate of interest is $7\frac{1}{2}$ %, and the face of the draft is $625?

29. Exchange being at $\frac{3}{5}$ % premium, what was the face of a sight draft on Memphis for which $1358.10 was paid?

30. $575.94 was paid for a sight draft on Omaha. If exchange was at $\frac{7}{10}$ % discount, what was the face?

31. Exchange being at par, what was the face of a ninety-day draft on Sacramento costing $649.77, if interest was 6 %?

32. A sight draft on Little Rock for $1500 cost $1511.25. What was the rate of premium?

33. A sight draft on Harrisburg for $1050 cost $1057.35. What was the rate of exchange?

34. I paid 1835.20 for a bill of exchange on Cincinnati for $1850. What was the rate of exchange?

35. The cost of a draft on St. Paul was $2527.05. If the face of the draft was $2550, what was the rate of discount?

36. A bill of exchange on Springfield cost the purchaser $725. If the time was 42 days, exchange at $\frac{1}{2}$ % premium, and interest 4 %, what was the face of the draft?

37. Find the cost of a draft on St. Louis for $1750, due in 60 days, exchange at $\frac{3}{4}$ % premium, interest 6 %.

38. The cost of a bill of exchange on New Orleans, payable in 60 days, was $1893.75. If exchange was at $2\frac{1}{2}$ % premium, and interest 8 %, what was the face of the draft?

39. The cost of a bill of exchange on Wheeling, due in 45 days, was $871.20. If exchange was at $\frac{1}{5}$ % discount, and interest 6 %, what was the face?

40. Find the cost of a ninety-day draft on Chicago for $1760, exchange $\frac{3}{4}$ % premium, interest 6 %.

41. The cost of a sixty-day draft on San Francisco was $1514.76. If exchange was at $1\frac{1}{2}$ % discount, and interest 8 %, what was the face?

42. A tourist purchased a thirty-three-day draft on Seattle for $1000. If exchange was at $\frac{4}{5}$ % premium, and interest 8 %, what did he pay for it?

# INSURANCE.

ARTICLE 204.

## Fire and Marine Insurance.

1. Insured a house worth \$2240 for $\frac{7}{8}$ of its value, at $1\frac{3}{5}\%$. What premium did I pay?

2. A house is worth \$3000, and the furniture \$2000. I insured the house for $\frac{5}{6}$ of its value, at $3\%$, and the furniture for $\frac{3}{4}$ of its value, at $2\%$. Find entire cost.

3. A store is worth \$5280, and the stock \$6240. The store is insured for $\frac{2}{3}$ of its value, at $\frac{5}{8}\%$, and the stock for $\frac{3}{4}$ of its value, at $\frac{4}{5}\%$, the policy costing \$1.75. How much was paid for insurance?

4. A boat is valued at \$4800, and the cargo at \$4500. Insured $\frac{4}{5}$ of the value of the boat, at $2\frac{1}{2}\%$, and $\frac{3}{4}$ of the value of the cargo, at $1\frac{2}{3}\%$, the policy costing \$1.50. What was the total cost of insurance?

5. A factory is worth \$3200, and the machinery \$3760. The factory is insured for $\frac{4}{5}$ of its value, at $1\frac{3}{4}\%$, and the machinery for $\frac{3}{4}$ of its value, at $1\frac{2}{3}\%$, the policy costing \$1.25. What was the entire bill?

6. A house cost \$3250, and the furniture \$2400. Insured $\frac{4}{5}$ of the value of the house, at $2\frac{3}{4}\%$, and $\frac{3}{4}$ of the value of the furniture, at $1\frac{2}{3}\%$. What was the entire cost of insurance, including \$1.25 charged for the policy?

7. Insured a vessel, worth \$18600, for $\frac{5}{8}$ of its value, at $1\frac{4}{5}\%$, and the cargo, worth \$25800, for $\frac{3}{4}$ of its value, at $\frac{5}{6}\%$. How much did I pay?

8. Insured my house, worth \$2760, for $\frac{2}{3}$ of its value, paying \$46 premium. What was the rate of insurance?

9. The cost of insuring property, worth $3250, for $\frac{4}{5}$ of its value, was $45.50. What percent was paid?

10. I paid $81.90 for insuring $\frac{5}{6}$ of the value of a horse worth $5460. At what rate was it insured?

11. $74.25 was paid for insuring $\frac{3}{5}$ of the value of a store worth $4500. What was the rate of premium?

12. Insured a dwelling, worth $2160, for $\frac{3}{4}$ of its value, paying $54 premium. What was the rate of insurance?

13. Insured a barn for $\frac{7}{8}$ of its value, at $2\frac{1}{2}\%$, paying $40.25 premium. What was the value of the barn?

14. Paid $58.32 premium for insuring $\frac{3}{4}$ of the value of a mill, at $1\frac{3}{5}\%$. What was the mill worth?

15. The cost of insuring $\frac{4}{5}$ of the value of a store, at $2\frac{1}{2}\%$, was $76. Find value of store.

16. Insured my residence for $\frac{7}{8}$ of its value, at $2\frac{2}{5}\%$, paying $117.60 premium. What was the residence worth?

17. Paid $120.05 premium for insuring $\frac{7}{10}$ of the value of a boat, at $3\frac{1}{2}\%$. What was the value of the boat?

18. The cost of insuring $\frac{9}{10}$ of the value of a cargo of wheat, at $2\frac{4}{5}\%$, was $131.04. What was the cargo worth?

19. Insured $\frac{6}{7}$ of the value of a stock of goods at $1\frac{3}{5}\%$, and paid $48.96 premium. What were the goods worth?

20. A merchant insured his store for $\frac{7}{8}$ of its value, at $1\frac{2}{3}\%$, paying $47.53 premium, and $\frac{4}{5}$ of the value of the stock, at $2\frac{3}{4}\%$, paying $60.72 premium. What was the combined value of the store and the stock?

21. A manufacturer paid $22.75 for insuring $\frac{5}{8}$ of the value of his mill, at $1\frac{3}{4}\%$, and $29.75 for insuring $\frac{7}{8}$ of the value of the machinery, at $1\frac{2}{3}\%$. What was the entire value of mill and machinery?

22. Insured a boat for $\frac{2}{3}$ of its value, at $1\frac{3}{4}$ %, paying $31.50 premium, and the cargo for $\frac{4}{5}$ of its value, at $1\frac{5}{8}$ %, at a premium of $40.95. Find combined value of boat and cargo.

23. The cost of insuring a house for $\frac{7}{8}$ of its value, at $1\frac{1}{2}$ %, was $36.75, and the furniture for $\frac{4}{5}$ of its value, at $2\frac{1}{4}$ %, was $41.85. What was the entire value of the property?

24. Paid $51.80 premium for insuring $\frac{4}{5}$ of the value of a factory, at $2\frac{1}{3}$%, and $58.50 premium for insuring $\frac{3}{4}$ of the value of the stock, at $2\frac{1}{2}$ %. What was the entire value of the property?

25. Insured $\frac{3}{4}$ of the value of a vessel, at $3\frac{1}{3}$ %, paying $3200 premium, and $\frac{7}{10}$ of the value of the cargo, at $2\frac{3}{5}$ %, paying $2275 premium. What was the combined value of vessel and cargo?

26. Paid $54 for insuring a dwelling worth $3750, at $1\frac{4}{5}$ %. What part of the value was insured?

27. The cost of insuring a factory worth $12400, at $1\frac{3}{5}$ %, was $173.60. What fraction of the value was insured?

28. The premium for insuring a store worth $9600, at $1\frac{2}{3}$ %, was $120. What part of the value was insured?

29. Insured a house worth $6400, at $2\frac{3}{4}$ %, paying $158.40 premium. What fraction of the value was insured?

30. Paid $1968.75 for insuring a block of buildings worth $90000, at $2\frac{5}{8}$ % premium. What part of the value was insured?

31. A paid $75 premium for insuring $\frac{4}{5}$ of the value of his house, at $2\frac{1}{2}$ %; B paid $77 premium for insuring $\frac{7}{10}$ of the value of his house, at $2\frac{3}{4}$ %. What was the difference in the value of the two houses?

32. A vessel worth $28000 was insured for $\frac{6}{7}$ of its

value, at $3\frac{1}{3}\%$. If it were lost at sea, what would be the net loss to the underwriters?

33. A carriage factory and stock worth $40000 were insured for $\frac{9}{10}$ of their value, at $3\frac{1}{2}\%$. If they were destroyed by fire, what would be the actual loss to the company?

34. Insured a house worth $3650 for $\frac{4}{5}$ of its value, paying $43.80 premium. What was the rate of premium?

---

# TAXES.

ARTICLES 208 AND 209.

1. A tax of $66000 is to be levied upon a valuation of $2750000. What is the rate?

2. The taxable property of a city is assessed at $35845000. The amount of tax to be raised is $967815. What will be the rate of taxation?

3. The cost of building a school house was estimated at $3795, to be raised by a tax of 23 mills on the dollar. What was the assessed valuation?

4. A tax of 18 mills on the dollar produced $4331.25. What was the valuation?

5. In a district whose valuation was $875750, it was found necessary to assess a tax of $18390.75. What was the rate of taxation?

6. If the valuation is $654850, and the rate 19 mills, what will be the tax?

7. If the tax is $2252.60, and the rate $17\frac{1}{2}$ mills, what is the valuation?

8. If the valuation is $1946500, and the tax $33090.50, what is the rate?

9. If the valuation is $349740, and the tax $5246.10.

what tax must a man pay whose property is assessed at $1750?

10. Valuation, $324500; tax, $8761.50. Find the rate, and A's tax on property valued at $1560.

11. If a man whose property is assessed at $1850, pays a tax of $25.90, what is the valuation, if the entire amount of tax is $3160.50?

12. If a man whose property is assessed at $1280, pays a tax of $22.40, what is the entire amount of tax, if the valuation is $453600?

13. Valuation, $325250; A's property is assessed at $1650, and he pays $28.05 tax. What is the entire tax?

14. Tax, $6352.50; A's property is assessed at $2250, and he pays $49.50 tax. What is the valuation?

15. The taxable value of a district is $75250; B's property is assessed at $1750, and his tax is $31.50. What is the entire amount of tax?

16. If Mr. Smith's property is assessed at $1000, and his tax is $14.50, what is the valuation, if the entire amount of tax is $12042.25?

17. If Mr. Brown's property is valued at $1050, and his tax $12.60, what is the entire amount of tax if the valuation is $78975?

18. Valuation, $251600; tax, $4270.60; number polls, 140, at $1.75 each. Find the rate, and A's tax on property valued at $975, he paying 1 poll.

19. Valuation, $425000; tax, $9147.50; number polls, 178, at $1.25 each. Find the rate, and B's tax on property assessed at $2750, he paying 3 polls.

20. Valuation, $845000; tax, $24201.50; number polls, 361, at $1.50 each. Find the rate, and C's tax on property valued at $4250, he paying 2 polls.

21. Valuation, $768250; tax, $14231; number polls, 322, at $1.25 each. Find the rate, and A's tax on property assessed at $950, he paying 2 polls.

**22.** Valuation, $82500; tax, $2156.25; number polls, 125, at 75 cents each. Find A's tax on property valued at $1250, he paying 3 polls.

**23.** Valuation, $325600; tax, $5878.95; number polls, 275, at $1.25 each. Find A's tax on property assessed at $1650, he paying 1 poll.

**24.** Valuation, $187625; tax, $4690.50; number polls, 125, at $1.50 each. Find the rate, and A's tax on property valued at $3350, he paying 3 polls.

**25.** Valuation, $341250; tax, $5090; number polls, 250, at $1.25 each. Find the rate, and B's tax on property assessed at $3125, he paying 2 polls.

**26.** Valuation, $364750; tax, $8715.50; number polls, 261, at $1.25 each. Find C's tax on property valued at $1850, he paying 2 polls.

**27.** Valuation, $725750; tax, $14108; number polls, 425, at 75 cents each. Find the rate, and A's tax on property assessed at $2750, he paying 2 polls.

**28.** Tax, $8761.50. B's property is assessed at $1560, and he pays $42.12 tax. What is the valuation?

**29.** Valuation, $448500; tax, $6993; number polls, 354, at 75 cents each. A's tax is $38.25, including 1 poll. What is the value of his property?

**30.** Valuation, $668650; number polls, 341, at $1.25 each. A's property is valued at $1350, and he pays 1 poll. If his tax amounts to $22.85, what is the entire tax to be raised?

**31.** Valuation, $225600; number polls, 241, at $.75 each. A's property is assessed at $1560, and he pays 2 polls. If his tax amounts to $24.90, what is the entire tax to be raised?

# RATIO.

## Article 214.

*What is the ratio of*

1. 112 to 14?
2. 119 to 7?
3. $58\frac{1}{3}$ to $8\frac{1}{3}$?
4. $93\frac{3}{4}$ to 15?
5. $87\frac{1}{2}$ to $3\frac{1}{3}$?
6. 375 to $22\frac{1}{2}$?
7. 236.8 to 6.4?
8. $104\frac{1}{6}$ to $11\frac{1}{9}$?
9. 300 to $83\frac{1}{3}$?
10. 1250 to 187.5?
11. 59.5 to 85?
12. $33\frac{1}{3}$ to 60?
13. 74.4 to 93?
14. $38\frac{1}{2}$ to 49?
15. 345 to $383\frac{1}{3}$?
16. 4.75 to 25?
17. .63 to 42?
18. $73\frac{1}{2}$ to $78\frac{2}{5}$?
19. $208\frac{1}{3}$ to $333\frac{1}{3}$?
20. .72 to .96?
21. $\frac{7}{8}$ to $\frac{4}{5}$?
22. .76 to .4?
23. $\frac{11}{12}$ to $\frac{1}{3}$?
24. 8.4 to .3?
25. 115 to $\frac{23}{24}$?
26. 12.1 to $\frac{11}{16}$?
27. 2000 to $1\frac{7}{8}$?
28. $1111\frac{1}{9}$ to $\frac{8}{9}$?
29. $666\frac{2}{3}$ to $\frac{5}{12}$?
30. .625 to .05?
31. 888.3 to .9?

## Article 215.

*Find the antecedent:*

1. Consequent, 63; ratio, 9.
2. Consequent, 4.5; ratio, 12.
3. Consequent, $13\frac{1}{3}$; ratio, 15.
4. Consequent, 378; ratio, $\frac{2}{3}$.
5. Consequent, 10.5; ratio, 6.4.
6. Consequent, $\frac{7}{9}$; ratio, $\frac{3}{4}$.
7. Consequent, $\frac{18}{25}$; ratio, $\frac{5}{9}$.
8. Consequent, 750; ratio, .04.

9. Consequent, 162.5; ratio, .6.
10. Consequent, $\frac{9}{20}$; ratio, $11\frac{1}{9}$.
11. Consequent, .99; ratio, $16\frac{2}{3}$.
12. Consequent, $77\frac{7}{9}$; ratio, 10.8.
13. Consequent, 1111; ratio, $\frac{9}{11}$.
14. Consequent, 1000; ratio, .001.
15. Consequent, .003; ratio, 1000.

## Article 216.

*Find the consequent:*

1. Antecedent, 1235; ratio, 13.
2. Antecedent, 14.1; ratio, 47.
3. Antecedent, $56\frac{1}{4}$; ratio, $4\frac{1}{2}$.
4. Antecedent, $\frac{2}{5}$; ratio, $\frac{3}{4}$.
5. Antecedent, 144; ratio, $1\frac{2}{3}$.
6. Antecedent, .58; ratio, $\frac{2}{3}$.
7. Antecedent, $23\frac{1}{8}$; ratio, $7\frac{1}{2}$.
8. Antecedent, 592; ratio, 6.4.
9. Antecedent, 1260; ratio, $\frac{7}{8}$.
10. Antecedent, 1050; ratio, 18.
11. Antecedent, 7625; ratio, $8\frac{1}{3}$.
12. Antecedent, 625; ratio, .375.
13. Antecedent, $55\frac{5}{9}$; ratio, $1\frac{1}{4}$.
14. Antecedent, 99; ratio, 14.4.
15. Antecedent, 100; ratio, .01.

## ARTICLE 217.

*Find the value of the following compound ratios:*

1. $\begin{cases} 12 : 8. \\ 15 : 9. \end{cases}$

2. $\begin{cases} 9 : 24. \\ 13 : 12. \\ 16 : 5. \end{cases}$

3. $\begin{cases} 110 : 45. \\ 19 : 11. \\ 36 : 25. \\ 80 : 76. \end{cases}$

4. $\begin{cases} 27 \text{ men} : 42 \text{ men}. \\ 39 \text{ days} : 9 \text{ days}. \\ 21 \text{ rods} : 13 \text{ rods}. \end{cases}$

5. $\begin{cases} 33 \text{ oxen} : 75 \text{ oxen}. \\ 84 \text{ acres} : 22 \text{ acres}. \\ \$125 : \$63 \\ 42 \text{ days} : 28 \text{ days}. \end{cases}$

6. $\begin{cases} 45 \text{ tons} : 39 \text{ tons}. \\ 117 \text{ miles} : 18 \text{ miles}. \\ \$192 : \$135. \\ 27 \text{ days} : 12 \text{ days}. \end{cases}$

7. $\begin{cases} 7.8 : 68. \\ 102 : 2.4. \\ 48 : 9. \\ 144 : 39. \end{cases}$

8. $\begin{cases} 69 \text{ cows} : 54 \text{ cows}. \\ 35 \text{ days} : 46 \text{ days}. \\ 24 \text{ acres} : 15 \text{ acres}. \\ \$450 : \$175. \end{cases}$

9. $\begin{cases} \frac{8}{3} : \frac{4}{11}. \\ \frac{9}{7} : \frac{18}{25}. \\ \frac{51}{50} : \frac{17}{14}. \end{cases}$

10. $\begin{cases} 3\frac{1}{3} : 6\frac{1}{4}. \\ 43\frac{3}{4} : 11\frac{1}{5}. \\ 13\frac{1}{3} : \frac{5}{18}. \end{cases}$

## ARTICLE 219.

### Reduction of Ratios.

*Reduce the following ratios to their lowest terms:*

1. 91 : 26.
2. 437 : 323.
3. 575 : 483.
4. 551 : 435.
5. 492 : 205.
6. 403 : 341.
7. 333 : 296.
8. 752 : 611.
9. 901 : 1007.
10. 649 : 885.
11. 732 : 1037.
12. 938 : 1675.
13. 497 : 639.
14. 949 : 1387.
15. 1264 : 1343.

### Article 220.

### Clearing Ratios of Fractions.

*Clear the following of fractions:*

1. $13\frac{1}{2} : 8\frac{1}{3}$.
2. $18\frac{3}{4} : 5\frac{2}{3}$.
3. $16\frac{2}{3} : 7\frac{1}{2}$.
4. $56\frac{1}{4} : 14\frac{2}{7}$.
5. $83\frac{1}{3} : 31\frac{1}{4}$.
6. $26\frac{2}{3} : 9\frac{1}{11}$.
7. $68\frac{3}{4} : 37\frac{1}{2}$.
8. $77\frac{7}{9} : 33\frac{1}{3}$.
9. $66\frac{2}{3} : 93\frac{3}{4}$.
10. $42\frac{6}{7} : 55\frac{5}{9}$.
11. $8\frac{3}{4} : 44\frac{4}{9}$.
12. $41\frac{2}{3} : 87\frac{1}{2}$.
13. $53\frac{1}{3} : 81\frac{1}{4}$.
14. $3\frac{1}{5} : 8\frac{8}{9}$.
15. $7\frac{3}{11} : 11\frac{3}{7}$.

---

# PROPORTION.

### Article 223.

*To find missing terms.*

1. 10 : 12 : : 35 : what?
2. 15 : 18 : : what : 78?
3. 68 : what : : 51 : 27?
4. What : 87 : : 7 : 21?
5. $6\frac{1}{4} : 11\frac{2}{3} : : 37\frac{1}{2}$ : what?
6. $66\frac{2}{3} : 88\frac{8}{9} : : 56\frac{1}{4}$ : what?
7. $83\frac{1}{3} : 55\frac{5}{9} : :$ what : $93\frac{3}{4}$?
8. What : $42\frac{6}{7} : : 57\frac{3}{4} : 52\frac{4}{5}$?
9. $\frac{3}{4}$ : what : : $\frac{2}{9}$ : 8?
10. $2\frac{1}{2} : 3\frac{1}{3} : :$ what : 9?
11. $\left.\begin{matrix} 12 : \text{what} \\ 9 : 7\frac{1}{2} \end{matrix}\right\} : : 32 : 45$?
12. $\left.\begin{matrix} 22\frac{2}{9} : 18\frac{3}{4} \\ 45 : \text{what?} \end{matrix}\right\} : : 40 : 39$?
13. $17 : 91 : : \left\{\begin{matrix} 85 : 65 \\ \text{what} : 49? \end{matrix}\right.$

14. $75 : \frac{9}{10} :: \left\{ \begin{matrix} \frac{2}{3} : \text{what?} \\ 87\frac{1}{2} : \frac{3}{4} \end{matrix} \right.$

15. $\left. \begin{matrix} \text{What} : 16.5 \\ 31.5 : 22.5 \end{matrix} \right\} :: 12.6 : 82.5?$

16. $18.75 : 27.5 :: \left\{ \begin{matrix} \text{what} : 55? \\ 62.5 : 50 \end{matrix} \right.$

## ARTICLE 224.

### Simple Proportion.

1. If 45 yds. of cloth cost $72, what will be the cost of 53 yds.

2. Bought 32 bu. of corn at the rate of 6 bu. for $3.15. What did it cost?

3. If 12 men can do a certain work in 9 days, how many men could complete it in 6 days?

4. If $\frac{5}{8}$ of a ton of hay cost $11.25, what will be the cost of $\frac{4}{5}$ of a ton?

5. If a train, running at the rate of $\frac{7}{16}$ mile per minute, requires 3.6 hr. to make a trip, in what time could it do so by running at the rate of $\frac{9}{20}$ mile per minute?

6. $\frac{7}{16}$ of a barrel of cider cost $2\frac{5}{8}$. What part of a barrel will cost $5\frac{2}{5}$?

7. If 1 oz. 5 pwt. of gold is worth $47.30, what is 2 oz. 15 pwt. worth?

8. If 8 men can reap a field in $3\frac{3}{4}$ days, in how many days could 15 men reap it?

9. If 289 yds. of muslin cost $26.01, how many yards could be bought for $16.65?

10. A quantity of provisions will last 525 men 68 days; how long would it last 350 men?

11. If I pay $1875 for 37.5 acres of land, how many acres should I receive for $2750?

12. 26 men built a wall in 21 days; how many men could have built it in 14 days?

13. A man bought 2835 bu. of corn at 52 cts. a bushel, but having lost 378 bu. by fire, what price per bushel must he charge for the remainder to incur no loss?

14. If $6\frac{3}{4}$ bls. of flour cost $\$37\frac{1}{8}$, how many barrels could be bought for $\$41\frac{1}{4}$?

15. If a mason build $\frac{9}{16}$ rod of wall in $\frac{5}{8}$ day, how many rods could he build in $6\frac{2}{3}$ days?

16. A farmer having 308 bu. 3 pks. of oats, worth $\$148.20$, sold a part for $\$93.60$. How many bushels did he sell?

17. If a pole 12.5 ft. high cast a shadow 18.75 ft. long, how high is a steeple whose shadow at the same time is 178.5 ft. long?

18. If $5\frac{5}{8}$ tons of coal cost $\$20\frac{1}{4}$, how many tons could be bought for $\$62\frac{2}{5}$?

19. 48 men are engaged to build a vessel in 90 days. If it were necessary to complete the work in 80 days, how many more men should be employed?

20. If 1000 ft. of lumber cost $\$18.75$, what would be the cost of 7280 ft.?

21. If a man whose property is worth $\$2750$, pays $\$66$ tax, what tax should a man pay whose property is worth $\$2150$?

22. If $18\frac{3}{4}$ tons of coal cost $\$83\frac{1}{3}$, what would be the cost of $10\frac{1}{8}$ tons?

23. If a tree 97.5 ft. high cast a shadow 62.4 ft. long, what would be the length of the shadow of a chimney whose height is 156.25 ft.

24. A man failing in business owes $\$16250$, and has property worth $\$13650$. How much can he pay to A, to whom he owes $\$850$?

25. If a carload of lumber be taken 192 miles for $\$28.80$, how far should it be taken for $\$47.25$?

26. A drover bought 125 hogs at $\$4.40$ each. Had they cost $\$5.50$ apiece, how many could he have bought?

27. If the interest of a certain sum of money is $78.75 for 3 yrs. 9 mo., how much should it be for 2 yrs. 3 mo.?

28. A meadow is 40 rods long and 39 rods wide. What should be the length of another meadow of the same area, whose width is 30 rods?

29. If five pipes can empty a reservoir in 8 days, how many pipes would be required to empty it in $6\frac{2}{3}$ days?

30. If $8\frac{1}{3}$ tons of hay cost $137.50, how many tons could be bought for $112.20?

31. If a tree 75 ft. high cast a shadow 125 ft. long, how long a shadow will be cast at the same time by a tree that is 60 ft. high?

32. If it requires 36 yds. of carpet, 1 yd. wide, to cover a floor, how many yards $\frac{3}{4}$ yd. wide would the same floor require?

33. A company of 112 men have provisions for 10 weeks. If 28 men join them, how long would the provisions last?

34. If 88 men build a road in 45 days, how many men could build it in $13\frac{1}{3}$ days?

35. Find the cost of 45875 bricks at $13.20 per thousand.

36. A's profits for a certain year were $585, and B's $975. If B's capital was $2750, what was A's capital?

37. If 76 bu. 1 pk. of corn are worth 122 bu. of oats, how many bushels of corn are worth 216 bu. of oats?

38. A man can earn $2\frac{1}{4}$ while a boy earns $\frac{3}{4}$. How much can the man earn while the boy earns $12\frac{1}{2}$?

39. If $725 produce $261 interest in a certain time, what sum would produce $243 interest in the same time?

40. 72 men have provisions for 75 days. How many must leave, that it may last the remainder 100 days?

41. What will be the cost of 17250 lb. of hay at $16 per ton?

42. If a steeple 135 ft. high cast a shadow 99 ft. in length, what is height of a steeple whose shadow at the same time is 143 ft. in length?

43. If $41\frac{2}{3}$ is $9\frac{3}{8}$ times a certain number, what is $56\frac{1}{4}$ times the same number?

44. If a lot 32 ft. front is worth $536, what front should a lot have that is worth 804?

45. If an express train travel 375 miles in 10 hrs., what time would it require to go 525 miles?

46. 7 pipes fill a reservoir in 65 hrs. If 2 of the pipes are closed, how long would it take the others?

47. My profit on $1260 worth of sales was $189. At the same rate, what should be the profit on $3720 worth?

48. If a loaf of bread weigh 8 oz., when flour is $\$7\frac{1}{2}$ a barrel, what should it weigh when flour is $\$6\frac{2}{3}$ a barrel?

49. If $76\frac{2}{3}$ bls. of flour cost $\$517\frac{1}{2}$, how many barrels could be purchased for $450?

50. How many bushels of wheat, at $.83 per bushel, should be given for 975 bu. 1 pk. of corn, at $.47 per bushel?

51. If a locomotive can run $66\frac{2}{3}$ miles with $47\frac{1}{2}$ bu. of coal, how far could it run with $68\frac{2}{5}$ bu.?

52. If $6\frac{1}{4}$ yds. of cloth cost $\$16\frac{2}{3}$, what would be the cost of 20 yds.?

53. If $27\frac{4}{5}$ bls. of flour cost $\$185\frac{1}{8}$, how many barrels can be bought for $\$124\frac{1}{6}$?

54. If a yardstick held upright cast a shadow $5\frac{1}{3}$ ft. long, how high is a tree whose shadow at the same time is 152 ft. long?

55. If a man can earn $355.50 in $\frac{3}{8}$ of a year, how much should he earn in $\frac{5}{6}$ of a year?

56. What cost $56\frac{1}{4}$ yds. of cloth, if $\frac{5}{8}$ of a yard costs $\$\frac{9}{10}$?

57. If $\frac{5}{12}$ of a barrel of sugar cost $\$8\frac{3}{4}$, what part of a barrel will cost $\$18\frac{3}{8}$?

58. What cost $13\frac{1}{3}$ bu. of potatoes, if $14\frac{3}{5}$ bu. cost $\$2.73\frac{3}{4}$?

59. A travels $8\frac{1}{3}$ miles to B's $6\frac{3}{4}$ miles. How far will B have gone when A has traveled $58\frac{1}{3}$ miles?

60. How many barrels of sugar can be purchased for $\$193\frac{3}{4}$, if $31\frac{1}{2}$ bls. cost $\$262\frac{1}{2}$?

61. If a man can perform a journey in $5\frac{3}{5}$ days, what part of it can he perform in $3\frac{1}{2}$ days?

62. If $11\frac{2}{3}$ cords of wood cost $\$65\frac{1}{3}$, what cost $8\frac{4}{7}$ cords?

63. If $68\frac{3}{4}$ is $62\frac{1}{2}\%$ of a certain number, what is $87\frac{1}{2}\%$ of the same number?

64. If $9\frac{3}{8}$ yds. of cloth cost $\$26\frac{1}{4}$, how many yards could be bought for $\$24\frac{4}{5}$?

65. If $18\frac{3}{4}$ tons of anthracite cost $\$156\frac{1}{4}$, how many tons would cost $\$775$?

66. How many barrels of flour could be bought for $\$76\frac{2}{3}$, if $18\frac{3}{4}$ bls. cost $\$86\frac{1}{4}$?

67. If $3\frac{3}{4}$ is $2\frac{1}{2}$ times a certain number, what is $3\frac{1}{8}$ times the same number?

68. The length of a wall by a measuring line was 576 ft., but the line was found to be 36 ft. $1\frac{1}{2}$ inches in length instead of 36 ft., as it was supposed. What was the true length of the wall?

ARTICLE 225.

## Compound Proportion.

1. If the wages of 35 men for 16 days of 12 hrs. each be $1008, how many days of 9 hrs. each should 45 men work to receive $1215?

2. If 15 men in 12 days of 10 hrs. each can build a wall 350 ft. long, 6 ft. high, and $2\frac{1}{2}$ ft. thick, how many men will it require to build a wall 250 ft. long, 7 ft. high, and 3 ft. thick, in 8 days of 9 hrs. each?

3. If it cost $112 to haul 32 slabs of marble, each 8 ft. long, 4 ft. wide, and 6 in. thick, for a distance of 15 miles, how much should it cost to haul 24 slabs of the same kind of marble, each 9 ft. long, $4\frac{1}{2}$ ft. wide, and 8 in. thick, for a distance of 18 miles?

4. If the interest of $720 for 3 yrs. 9 mo. 18 days, at a certain rate percent, is $205.20, what should be the interest of $840 for 2 yrs. 7 mo. 15 days, at $\frac{4}{5}$ as great a rate?

5. If a plate of iron 16 ft. long, 3 ft. wide, and 2 in. thick, weigh 3456 lb., what will be the weight of a block of wood 18 ft. long, 4 ft. wide, and 14 in. thick, if iron weigh 8 times as much as wood?

6. If 36 men in 28 days of 8 hrs. each can build a wall 680 ft. long, 12 ft. high, and 3.5 ft. thick, how long a wall that is to be 2.5 ft. thick and 10 ft. high, can 24 men build in 15 days of 10 hrs. each?

7. If 3860 tons of iron ore produce $28950 worth of metal, when iron is $31.25 a ton, what will be the value of the iron from 2980 tons of ore, at $36.25 a ton?

8. If the granite for a street $1\frac{4}{5}$ miles long, 50 ft. wide, cost $126720, when the blocks are 6 in. in depth, what would be the cost of the granite for a street $2\frac{4}{5}$ miles long, 60 ft. wide, if the blocks are 7 in. in depth?

9. If 8 compositors in 30 days of 10 hrs. each can

set up 24 sheets of 32 pages each, with 2 columns to the page, 40 lines to the column, and 36 ems to the line, in how many days, of 9 hrs. each, can 12 compositors set up 36 sheets of 48 pages each, 1 column to the page, 45 lines to the column, and 64 ems to the line?

10. If it costs $18.75 to carpet a parlor 18 ft. long and 15 ft. wide, with ingrain carpet 1 yard wide, at 62½ cts. a yard, what would it cost to carpet a parlor 27 ft. long and 21 ft. wide, with Brussels carpet, ¾ yd. wide, at $1.12½ a yard?

11. If 5 men can mow 3 meadows, each containing 24 acres, in 8 days of 12 hrs. each, how many hours a day must 7 men work for 10 days, to mow 5 meadows, each containing 21 acres?

12. If it require 4050 tiles, each 8 in. square, to pave a certain courtyard, how many tiles 12 in. long and 10 in. wide would be required to pave another yard twice as large?

13. If the provisions for a fleet of 11 vessels, each manned by 120 men, cost $73500 for a five-months' cruise, what would be the cost of the provisions for a fleet of 8 vessels, each carrying 132 men, for a seven-months' cruise?

14. If the duty on 28 bolts of broadcloth, each containing 45 yds., valued at $2.50 a yard, be $945, what would be the duty on 32 bolts of broadcloth, each containing 48 yds., valued at $2.75 a yard?

15. If the wages of 48 men for 15 days of 9 hrs. each be $1296, what should be the wages of 25 men for 13 days of 8 hrs. each?

16. If the interest of $660 for 2 yrs. 10. mo. 15 days, at a certain rate percent, is $151.80, what principal should produce $127.50 interest in 3 yrs. 4 mo. 24 days, at ⅝ as great a rate?

17. If 10 men in 12 days of 9 hrs. each can dig a

ditch 288 yds. long, $4\frac{1}{2}$ ft. wide, and $3\frac{3}{4}$ ft. deep, how long a ditch that is to be 6 ft. wide and 5 ft. deep can 6 men dig in 15 days of 8 hrs. each?

18. If the freight on 260 boxes of soap, each $1\frac{2}{3}$ ft. long, $1\frac{3}{5}$ ft. wide, and $1\frac{1}{2}$ ft. deep, be \$99 for a distance of 385 miles, how far could 480 boxes of soap, each $2\frac{2}{3}$ ft. long, $2\frac{1}{4}$ ft. wide, and $1\frac{1}{6}$ ft. deep, be carried for \$270?

19. If a column of granite 12 ft. long and 3 ft. 6 in. square weigh 44100 lb., what would be the weight of a column of marble 18 ft. long and 4 ft. 4 in. square, if granite is $1\frac{1}{2}$ times as heavy as marble?

20. If 8 oxen can be kept on 14 acres for 9 mo., how many sheep can be kept on 6 acres for 8 mo., if 7 sheep eat as much as 1 ox?

21. If 27 men in 4 days of 10 hrs. each can dig a ditch 360 yds. long, 6 ft. wide, and 4.5 feet deep, in how many days of 9 hrs. each can 15 men dig a ditch 270 yds. long, 5 ft. wide, and 3 ft. deep?

22. If 6 carpenters can lay the floors of 10 houses, each containing 7 rooms 16 ft. long and 13.5 ft. wide, in 5 days, of 9 hrs. each, how many carpenters will it require to lay the floors of 12 houses, each containing 8 rooms 15 ft. long and 14 ft. wide, in 4.5 days of 8 hrs. each?

23. If 3240 tons of iron produce \$27216 worth of metal when iron is \$24 a ton, how many tons of ore would be required to yield \$27720 worth of metal when iron is \$27.50 a ton?

24. If the granite for a street $1\frac{3}{4}$ miles long, 45 ft. wide, cost \$115500 when the blocks are 7 in. deep, what length of street that is 48 ft. wide could be paved for \$126720, if the blocks were 6 in. deep?

25. If 12 men in 9 days of 10 hrs. each can dig 15 cellars, each 30 ft. long, 18 ft. wide, and 6 ft. deep, how

many men can dig 20 cellars, each 27 ft. long, 14 ft. wide, and 8 ft. deep, in 8 days of 8 hrs. each?

**26.** If it cost $264 to carpet the floor of a church 66 ft. long, 48 ft. wide, with ingrain carpet 1 yd. wide, at 75 cts. a yard, what would be the cost of carpeting the floor of a church 72 ft. long and 51 ft. wide with Brussels carpet $\frac{3}{4}$ yd. wide, at $1.25 a yard?

**27.** If the interest of $625 for 3 yrs. 7 mo. 6 days, at a certain rate percent, is $135, in what time will $800 produce $76 interest, at $\frac{2}{3}$ as great a rate?

**28.** If the provisions for 2 regiments, each containing 9 companies of 110 men, cost $110880 for a campaign of 7 mo., how long could 5 regiments, each containing 10 companies of 100 men, be supplied for $240000?

**29.** If 12 horses can be kept on 15 acres for 7 mo., how many cows can be kept on 10 acres for 6 mo., if 2 horses eat as much as 3 cows?

**30.** If 18 men in 21 days of 10 hrs. each can build a wall 240 yds. long, 6 ft. high, and 2 ft. thick, in how many days of 9 hrs. each can 15 men build a wall 180 yds. long, 8 ft. high, and $2\frac{1}{2}$ ft. thick?

**31.** If the duty on 48 bales of wool of 450 lb. each, valued at $.25 a pound, be $2430, how many bales of 420 lb. each, valued at $.33$\frac{1}{3}$ a pound, would be required to pay a duty of $3465.

**32.** If 12 terriers can kill 600 rats in 15 min., how many rats can 30 terriers kill in 10 min.?

**33.** If the gravel for a street $\frac{3}{4}$ mile long, and 50 ft. wide, cost $4125 for a depth of 9 in., what would be the cost of macadamizing a street $1\frac{1}{4}$ miles long, 60 ft. wide, to a depth of 8 in., broken stone costing 80 % more than gravel?

**34.** If the freight on 360 boxes of starch, each $1\frac{3}{4}$ ft. long, $1\frac{1}{2}$ ft. wide, and $1\frac{1}{3}$ ft. deep, be $189 for a distance

of 315 miles, what should be charged for carrying 480 boxes, each $2\frac{1}{2}$ ft. long, $1\frac{2}{3}$ ft. wide, and 1 ft. deep, a distance of 252 miles?

35. If the interest of $1250 for 3.2 yrs., at 5%, be $200, at what rate percent would $600 produce $138 interest in $2\frac{7}{8}$ years?

36. If 18 men in 12 days of 10 hrs. each can dig a cellar 60 ft. long, 48 ft. wide, and 25 ft. deep, how many hours a day should 21 men work for 16 days to dig a cellar 64 ft. long, 50 ft. wide, and 28 ft. deep?

37. If 8 men can mow 6 meadows, each containing 15 acres, in $6\frac{1}{4}$ days of 12 hrs. each, in how many days of 9 hrs. each can 10 men mow 5 meadows, each containing 21.6 acres?

38. If 5 printers in 27 days of 9 hrs. each can set the type in 18 sheets of 24 pages each, with 2 columns to the page, 42 lines to the column, and 30 ems to the line, how many hours a day should 9 printers work for 28 days to set the type for 32 sheets of 36 pages each, with 1 column to the page, 49 lines to the column, and 40 ems to the line?

### Articles 226 and 229.

### Partnership.

1. Divide $357 among A, B, and C, so that their shares shall be in the ratio of 5, 7, and 9.

2. Two partners contributed $1800 and $1250 respectively. They lost $488. Divide the loss.

3. A's capital was $875; B's, $625. At the end of the year they had $2100. What was the share of each?

4. A contributed $850; B, $900; C, $1025. In a speculation they lost $999. Find each one's loss.

5. Divide 250.5 into two parts that shall have the ratio of 7.2 to 9.5.

6. Divide 276 into two parts that shall have the ratio of 6.9 to 11.5.

7. Divide 780 into three parts that shall be to each other as 8.4, 10.5, and 12.3.

8. Divide 5713 into two parts that shall have the ratio of $\frac{5}{8}$ and $\frac{7}{12}$.

9. Divide $1105 among A, B, and C, so that their shares shall be to each other as $\frac{2}{3}$, $\frac{4}{5}$, and $\frac{7}{10}$.

10. Divide $2585 among A, B, and C, so that their shares shall be to each other as $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{7}{8}$.

11. Divide $3075 among A, B, and C, so that their shares shall be to each other as $\frac{1}{2}$, $\frac{3}{4}$, and $\frac{4}{5}$.

12. Divide $399.50 among A, B, and C, so that their shares shall be in the ratio of $\frac{3}{4}$, $\frac{5}{8}$, and $\frac{7}{12}$.

13. Divide $1039.50 among A, B, and C, so that their shares shall be in the ratio of $\frac{5}{9}$, $\frac{7}{12}$, and $\frac{11}{18}$.

14. Divide $1601.60 among A, B, and C, so that their shares shall be in the ratio of $\frac{7}{12}$, $\frac{5}{8}$, and $\frac{11}{16}$.

15. A father left his three children the following sums: $1250, $1575, and $2025, but the property brought only $4074. What did each receive?

16. Four heirs were bequeathed respectively $1025, $950, $875, and $725, but the property only amounted to $3003. How much did each receive?

17. A furnishes $250, B $350, C $450; they lose $210. Divide the loss.

18. C, D, and E bought 752 acres of land; C paid $1250, D 1575, E $1875. How many acres should each have?

19. Three men load a vessel: A furnishes 125 tons, B 150 tons, C 175 tons; in a storm 108 tons are thrown overboard. Find loss of each.

20. E and F rent a tract of land for $225: E's part is 75 rods long and 32 rods wide; F's part is 80 rods long and 45 rods wide. What should each pay?

21. A school charters a boat for $77. Having but 240 to go, they receive on board another school of 180. What should the second school pay?

22. A furnished 550 bu. of wheat, at $1.20 a bushel; B 675 bu. of corn, at 40 cts. a bushel. They gained $139.50. What did each gain?

23. Two teamsters received $60.75 for hauling. The first hauled 15 loads of 1500 lb. each, daily for 6 days; the second, 12 loads of 1800 lb. each, daily for 5 days. How much should each receive?

24. A father divided his property, worth $20500, among his four sons in the ratio of their ages, which were respectively 25, 22, 19, and 16 yrs. What was the share of each?

25. A contributed $625 for 10 mo., B $500 for 14 mo., C $450 for 15 mo; they gained $500. How should it be divided?

26. A put in $900 for 10 mo., B $850 for 12 mo., C $720 for 15 mo.; they lost $525. What was the loss of each?

27. A furnished $850 for 9 mo., B $910 for 10 mo., C $750 for 11 mo.; they gained $1250. Divide the gain.

28. A contributed $1250 for 5 mo., B $1350 for 6 mo., C $1450 for 7 mo., and D $1550 for 8 mo.; they lost $1107. What was the loss of each?

29. A contributed $1500 for 7 mo., B $1675 for 8 mo., C $1750 for 9 mo., D $1850 for 11 mo. On dissolving, they had $8575. What was the share of each?

30. Smith put in $3750 for 16 mo., Brown $4800 for 15 mo. On dissolving, they had but $7285. What was the loss of each?

31. A pastures 15 cows 4 weeks 2 days, B 18 cows 2 weeks 6 days. What part of the rent should each pay?

32. C and D went into partnership for one year: C

put in $800, and D $500. How much more should D put in at the end of 9 mo. to be entitled to half the profits?

33. E and F enter into partnership for 18 mo. E contributes $1500, F $1200. How much more must F furnish at the end of 10 mo. to receive half the gain?

34. A and B engage in business for 15 mo. A furnishes $750, B $900. How much additional capital must A put in at the expiration of 9 mo. to receive half the profit?

35. C and D formed a partnership for two years. C furnished $1500, D $1875. How much more was C obliged to contribute at the end of 16 mo. to be entitled to half the profit?

36. E and F enter into partnership for 22 mo. E put in 900, F $750. How much more must F put in at the end of 16 mo. to receive half of the profits?

37. A and B form a partnership for 2 years. A contributes $1000, B $800. How much must A withdraw at the end of 18 mo. so that B may receive half of the profits?

38. A and B entered into partnership for 18 mo. A at first furnished $600, and at the end of 10 mo., $400 more. B at first put in $1200, but at the end of 8 mo. withdrew $560. They gained $645. How was it divided?

39. A and B formed a partnership for 20 mo. A at first contributed $560, and at the end of 14 mo., $800 more. B at first contributed $800, but at the end of 15 mo. drew out $300. They gained $2135. What was the share of each?

40. C and D engaged in trade for 16 mo. C at first put in $750, and at the end of 10 mo., $500 more; D at first put in $1200, but at the end of 5 mo. drew out $200. They gained $1120. Divide it.

41. E and F entered into partnership for 18 mo. E at first furnished $500, and at the end of 8 mo., $300 more. F at first furnished $1000, but at the end of 8 mo. drew out $300. They lost $720. Find the loss of each.

42. A and B formed a partnership for two years. A at first put in $1500, and at the end of 15 mo., $500 more. B at first furnished $2000, but at the end of 18 mo. drew out $750. They gained $1470. Find the gain of each.

43. C and D engaged in partnership for 18 mo. C at first contributed $600, and at the end of 10 mo., $400 more. D at first contributed $900, but at the end of 8 mo. drew out $300. They lost $510. Divide the loss?

44. A, B, and C formed a partnership for twenty-four months. A at first put in $5000, but at the end of 12 mo. drew out $1000. B at first contributed $5500, but at the end of 16 mo. drew out $3000. C furnished $4500 for the entire time. They gained $6000. What was each one's gain?

## Article 227.

### Bankruptcy.

1. A bankrupt's liabilities are $12600, and his assets $11025. How much can he pay on the dollar?

2. A merchant failing in business owes $10780. His stock sells for $9163. What percent can he pay his creditors?

3. A bankrupt's liabilities are $10400, and his assets $6500. How much will a creditor receive to whom he owes $1240?

4. A merchant becoming insolvent fails for $15625. His property amounts to $11875. How much will a creditor lose to whom he owes $785?

5. A bankrupt's liabilities are $8750, and his assets $7812.50. If the assignee's expenses are $375, what will a creditor receive whose claim is $850?

6. A wholesale merchant fails for $22500. His stock sells for $16340, and the assignee's charges are $1040. How much will a creditor lose whose claim is $1735?

7. A manufacturer failing, owes A $3120, B $4150, C $5180, D $6025. His stock and machinery sells for $14041, and the assignee's charges are $1847.50. What will each creditor receive?

8. A bankrupt owes the following sums: to A, $1460; to B, $1685; to C, $1750; to D, $1855. His assets amount to $6025, and the expenses are $355. How much will each creditor lose?

9. A retail merchant who had failed, found that his assets were $6720. He owed $925 to B, who received $592. For what amount did he fail?

10. An insurance company becoming insolvent had assets valued at $126000. C owned 45 shares ($100 each), and received $3240. What was the capital stock?

11. A receiver having taken charge of a manufactory, sold the establishment for $18700. A creditor's claim for $1075 was settled for $731. What was the value of the manufactory?

12. A contractor failing in business for $12500, owed $1040 to A, who lost $260. What were the entire assets?

13. A bankrupt's assets were $9900, and the assignee's expenses $450. A creditor, whose claim was $640, lost $80. What was the amount of the failure?

## ARTICLE 228.

### General Average.

1. A vessel was valued at $13500, and the cargo at $16500. In a storm it was found necessary to throw overboard goods worth $1350. What percent was the general average?

2. A steamer was worth $27500, and its cargo $37500. In extinguishing a fire, A's goods were damaged to the extent of $1625. What percent was the general average, and what loss did A actually sustain?

3. From a ship valued at $22500, carrying a cargo worth $25000, B's entire shipment of iron, amounting to $2375, was thrown overboard. What amount will he receive from the owners?

4. A packet steamer worth $37250, loaded with freight valued at $42750, was obliged to sacrifice freight worth $5000, of which $1280 worth belonged to C. How much did he lose?

5. A vessel valued at $17500 carried a cargo invoiced at $18500. It was found necessary to throw overboard goods worth $2700. A's loss was $138. What was the value of his consignment?

6. A ship costing $25000, with its cargo worth $35000, being caught in a storm, it became necessary to sacrifice freight valued at $4800. A received $2254 for his consignment. What was the value of his shipment?

7. An Inman steamer, valued at $125000, carried a cargo worth $250000. In extinguishing a fire, goods were damaged to the value of $11250. B received $4365 indemnity. What was his loss?

8. An ocean steamer sprung a leak. To save the vessel, A's shipment of sugar, worth $8760, B's consignment of salt, valued at $3520, and C's invoice of iron,

worth $6620, were thrown overboard. A received $8365.80 indemnity. How much did B and C each lose?

9. In a storm at sea, goods valued at $2625 were sacrificed, including D's shipment of petroleum, worth $1250. If his loss was only $43.75, what was the entire value of the vessel and cargo?

10. From a steamer appraised at $30000, freight amounting to $2000 was sacrificed, including C's consignment of pork valued at $750. If he received $731.25 indemnity, what was the value of the entire cargo?

ARTICLE 230.

## Equation of Payments.

*Find the average time in the following:*

1. $300, due in 2 mo.; $400, due in 3 mo.; $500, due in 4 mo.

2. $625, due in 4 mo.; $750, due in 5 mo.; $1125, due in 6 mo.

3. $375, due in 9 mo.; $475, due in 5 mo.; $525, due in 10 mo.

4. $50, due in 4 mo.; $60, in 5 mo.; $70, in 7 mo.; $90, in 9 mo.

5. $20, due in 20 days; $30, in 30 days; $40, in 40 days; $50, in 50 days; and $60, in 60 days.

6. $75, due now; $75, due in 3 mo.; $75, due in 4 mo.; and $75, due in 5 mo.

7. $500, due now; $500, due in 4 mo.; $500, due in 6 mo.; $500, due in 8 mo.

8. $250, due now; $500, due in 6 mo.; $750, due in 10 mo.

9. $125, due in 30 days; $250, due in 60 days; $375, due in 90 days.

10. $300, due in 30 days; $600, due in 60 days; $900, due in 90 days; $1200, due in 120 days.

11. Bought $800 worth of goods as follows: $\frac{1}{8}$, cash; $\frac{3}{8}$ in 8 mo.; balance in 9 mo. What is the equated time?

12. Bought $1500 worth of goods: $\frac{1}{5}$, cash; $\frac{2}{5}$ in 7 mo.; balance in 8 mo. Find equated time.

13. Bought $1800 worth of goods: $\frac{1}{3}$ at 5 mo.; $\frac{1}{4}$ at 6 mo.; balance at 8 mo. Find equated time.

14. Bought $1600 worth of goods: $\frac{1}{2}$ at 2 mo.; $\frac{3}{8}$ at 4 mo.; balance at 12 mo. Find equated time.

15. Bought $1000 worth of goods: $200 at 20 days; $300 at 30 days; balance at 50 days. Find equated time.

16. Bought the following bills: January 2, $50; February 1, $80, March 3, $70. Find equated time.

17. Bought, March 5, $200; April 10, $500; May 14, $300. Find equated time.

18. Sold, May 8, $125; May 24, $375; June 17, $450; June 25, $250. Find equated time.

19. Sold, June 12, $450; July 7, $550; July 12, $750; August 15, $250. Find equated time.

20. Sold, July 19, $120; August 3, $240; September 7, $360; October 2, $480. Find equated time.

21. Bought goods as follows: February 6, at 2 mo., $100; March 15, at 3 mo., $400; April 28, at 4 mo., $500. What was the equated time?

22. Bought goods as follows: June 29, at 3 mo., $200; July 24, at 4 mo., $450; August 27, at 5 mo., $550. What was the equated time?

23. Sold goods as follows: March 8, at 4 mo., $200; April 6, at 5 mo., $875; May 25, at 6 mo., $625; June 30, at 6 mo., $800. What was the equated time?

24. Sold goods as follows: December 8, 1891, at 3 mo., $350; January 12, 1892, at 4 mo., $400; February 24, 1892, at 5 mo., $500; March 4, 1892, at 6 mo., $750. Find equated time.

**25.** Bought goods as follows: June 3, 1891, at 2 mo., $1000; July 2, 1891, at 3 mo., $750; August 1, 1891, at 4 mo., $1250; August 30, 1891, at 5 mo., $1750; September 30, 1891, at 6 mo., $2250. What was the equated time?

## ARTICLE 232.

### Average.

**1.** A grocer mixed 20 lb. of coffee at 27 cts., 15 lb. at 28 cts., and 18 lb. at 35 cts. What was the average value of 1 lb.?

**2.** Mixed 45 bu. of oats at 25 cts. a bushel, 37 bu. of corn at 50 cts. a bushel, and 43 bu. of wheat at 75 cts. a bushel. What was the value of 5 bu.?

**3.** Mixed 5 gal. of wine at $1.25 a gallon, 6 gal. at $1.50 a gallon, and 9 gal. at $1.75 a gallon. What was the average value per gallon?

**4.** Bought 25 hogs at $6 each, 30 at $8 each, and 45 at $10 each. At what price per head must I sell them to gain 25 %?

**5.** A trader sold 30 horses at $50 each, 25 at $54 each, 24 at $60 each, and 21 at $110 each. If he lost 12 % on the transaction, what was the average cost per head?

**6.** 50 gal. of wine, at $1.60 a gallon, was diluted with $12\frac{1}{2}$ gal. of water. What was 1 gal. of the mixture worth?

**7.** A man built $3\frac{1}{2}$ rods of wall in 11 hrs. 9 min. at one time, 4 rods in 15 hrs. 6 min. at another, and $2\frac{1}{2}$ rods in 9 hrs. 15 min. at another. What was the average time of building 1 rod?

**8.** An alloy consisted of 18 oz. of gold, worth $17.55 per ounce; 15 oz. of silver, worth $1.02 per

ounce; and 6 oz. of copper, at 5 cts. per ounce. What was the average value of 1 oz. of the alloy?

9. A stock-dealer bought 75 sheep at $3.80 per head; 60, at $3.75 per head; and 90, at $4.33⅓ per head. At what price per head must he sell them to gain 15 %?

10. Mixed 8 gal. of wine, at $1.62½ a gallon, ½ gal. of brandy, at $6.30 a gallon, and 1 gal. of water. Find average value per gallon.

11. Five loads of hay weighed as follows: 1 ton 1 cwt. 16 lb.; 1 ton 80 lb.; 1 ton 2 cwt. 15 lb.; 1 ton 3 cwt. 19 lb.; 1 ton 20 lb. What was the average weight per load?

12. A man walked 3 miles in 45 min. 15 sec.; then 4½ miles in 1 hr. 5 min. 45 sec.; then 5 miles in 1 hr. 19 min. 50 sec. What was his average time for walking 1 mile?

13. If 50 gal. of alcohol, at 75 cts. a gal., 30 gal. whisky, at $1.15 a gal., and 10 gal. water be mixed, what will 1 gal. be worth?

14. A trader bought 12 horses at $75 each; 15, at $80 each: 18, at $70 each, and 30, at $88 each. At what price per head must he sell them to gain 25 %?

15. Mixed 16 gal. Catawba wine, at 55 cts.; 25 gal. Ives' Seedling, at 85 cts., with 22 gal. Sherry, at $1.50, and 2 gal. water. What was the average value per gal.?

16. Six ingots of silver weighed as follows: 5 lb. 4 oz. 17 pwt. 12 gr.; 4 lb. 11 oz. 16 pwt. 15 gr.; 5 lb. 2 oz. 19 pwt. 18 gr.; 4 lb. 10 oz. 15 pwt. 13 gr.; 5 lb. 1 oz. 18 pwt. 9 gr., and 4 lb. 9 oz. 17 pwt. 17 gr. What was the average weight of each?

17. A grocer mixed 33 lb. of tea, at 60 cts.; 40 lb., at 75 cts.; 45 lb., at 80 cts., and 52 lb., at 90 cts. He sold 5 lb. of the mixture to one customer at a gain of 16⅔ %. What did he receive for it?

**18.** A poulterer had a lot of eggs, which he intended to sell as follows: 14 doz., at 13 cts. a doz.; 12 doz., at 15 cts.; 15 doz., at $16\frac{2}{3}$ cts., and 16 doz., at $18\frac{3}{4}$ cts.; but having mixed them, at what price per doz. was he obliged to sell them to get the intended price?

**19.** A huckster bought 124 chickens, at 25 cts. each; 75 ducks, at $33\frac{1}{3}$ cts. each; 65 geese, at 50 cts., and 36 turkeys, at $66\frac{2}{3}$ cts. If he sells them at a profit of 20 %, what is the average selling price per doz.?

**20.** Six barrels of oil measured as follows: 31 gal. 1 qt. 1 pt. 3 gills; 30 gal. 3 qts. 1 pt. 1 gill; 31 gal. 1 qt. 2 gills; 32 gal. 1 pt. 2 gills; 30 gal. 2 qts. 1 pt. 3 gills, and 31 gal. 3 qts. 3 gills. What were the average contents per barrel?

**21.** A pedestrian walked 5 miles 2 yds. an hour for 5 hrs.; then 4 miles 12 rods 4 yds. an hour for 4 hrs.; then 3 miles 84 rds. 4 yds. an hour for 3 hrs. What was his average distance per hour?

**22.** A wholesale newsdealer bought 80 magazines, at 25 cts. each; 150 illustrated weeklies, at $8\frac{1}{3}$ cts. each; 850 dailies, at 5 cts; 120 novelettes, at $17\frac{1}{2}$ cts., and 50 cloth volumes, at 58 cts. What was the average cost of each?

**23.** A flour-dealer sold 25 bls. of flour at $6.40 a barrel; 40 bls. at $6.50 a barrel; 75 bls. at $5.60, and 20 bls. at $6. If he gained 20 % by the sale, what was the average cost per barrel?

**24.** A clothing merchant sold 40 suits of clothes at $17.75 each; 60 suits at $19.50; 50 suits at $22.40, and 30 suits at $23. If he lost 18 % by the sale, what was the average cost per suit?

**25.** A trader sold 22 horses at $60 each; 24 at $70; 26 at $75; 25 at $90, and 28 at $100. If he lost 20 % by the sales, what was the average cost per head?

**26.** A candy manufacturer's sales for one day were as

follows : 20 packages at 20 cts. ; 20 at 24 cts. ; 18 at 25 cts. ; 15 at 30 cts. 15 at 40 cts. ; 30 at 44 cts. ; 10 at 45 cts., and 22 at 50 cts. If he gained $16\frac{2}{3}$ % on the day's sales, what was the average cost per package ?

---

# INVOLUTION.

ARTICLE 234.

*Find the*

1. Second power of 93.
2. Third power of 37.
3. Fourth power of 26.
4. Fifth power of 2.1.
5. Second power of 47.8.
6. Third power of 7.7.
7. Fourth power of $5\frac{1}{2}$.
8. Second power of $33\frac{1}{3}$.
9. Third power of $11\frac{1}{9}$.
10. Sixth power of $1\frac{4}{5}$.

*Find the square of*

| | | | | | |
|---|---|---|---|---|---|
| 11. | 249. | 14. | $\frac{16}{25}$. | 17. | $27\frac{1}{7}$. |
| 12. | 56.25. | 15. | $3\frac{11}{18}$. | 18. | $8\frac{1}{20}$. |
| 13. | $73\frac{3}{4}$. | 16. | $17\frac{1}{17}$. | 19. | 18.75. |

*Find the cube of*

| | | | | | |
|---|---|---|---|---|---|
| 20. | 39. | 23. | $16\frac{2}{3}$. | 26. | $\frac{16}{25}$. |
| 21. | 135. | 24. | 12.1. | 27. | 11.1. |
| 22. | 109. | 25. | 249. | 28. | $4\frac{1}{5}$. |

*Find the fourth power of*

| | | | | | |
|---|---|---|---|---|---|
| 29. | 81. | 32. | $8\frac{1}{3}$. | 35. | $\frac{16}{16}$. |
| 30. | 5.1. | 33. | 7.5. | 36. | $11\frac{1}{9}$. |
| 31. | $5\frac{1}{2}$. | 34. | 32. | 37. | $3\frac{4}{37}$. |

*Find the fifth power of*

38. 11. 40. $3\frac{1}{3}$. 42. 5.5.
39. 2.2. 41. $6\frac{1}{4}$. 43. 101.

---

# EVOLUTION.

## ARTICLE 238.

### Square Root.

*Extract the square root of*

1. 289. 15. 574564. 28. 353.44.
2. 1521. 16. 788544. 29. 3.9601.
3. 4225. 17. 826281. 30. .00390625.
4. 8649. 18. 1002001. 31. .09018009.
5. 9801. 19. 1234321. 32. $\frac{4624}{7921}$.
6. 18496. 20. 3154176. 33. $\frac{6724}{8281}$.
7. 33856. 21. 4.41. 34. $\frac{21025}{71289}$.
8. 67081. 22. 46.24. 35. $\frac{655536}{128881}$.
9. 140625. 23. .0169. 36. 8.625969.
10. 249001. 24. 1.1449. 37. $976\frac{9}{16}$.
11. 316969. 25. .003136. 38. $1877\frac{7}{9}$.
12. 349281. 26. .015625. 39. $4279\frac{49}{144}$.
13. 368449. 27. .00120409. 40. 25.6.
14. 484416.

## ARTICLE 239.

*By factoring, find square root of*

1. 900. 6. 6084. 10. 27225.
2. 576. 7. 7056. 11. $12 \times 35 \times 105$.
3. 1764. 8. 11025. 12. $21 \times 77 \times 132$.
4. 9216. 9. 53361. 13. $8 \times 14 \times 21 \times 27$.
5. 2916.

ARTICLE 240.

## Applications of the Square Root.

1. What is the difference between $(.0225)^2$ and $\sqrt{.0225}$?

2. Resolve 327.2481 and 196.8409 each into two equal factors.

3. $\sqrt{\frac{6241}{11664}} + \sqrt{\frac{3364}{46656}} =$ what?

4. $\sqrt{\frac{2209}{7921}} - \sqrt{\frac{5625}{31684}} =$ what?

5. What is the difference between $625^2$ and $\sqrt{625}$?

6. Resolve 677.0404 and $\frac{4489}{6889}$ each into two equal factors.

7. A square field contains 131 acres 65 sq. rods. Find cost of fencing it at $\$.87\frac{1}{2}$ a rod.

8. A square field contains 47 acres 49 sq. rods. Find cost of fencing it at $66\frac{2}{3}$ cts. a rod.

9. A square field contains 18 acres 36 sq. rods. Find cost of fencing it at $68\frac{3}{4}$ cts. a rod.

10. A square field contains 100 acres 129 sq. rods. Find cost of fencing it at $43\frac{3}{4}$ cts. a rod?

11. A rectangular field is twice as long as it is wide, and its area is 78 acres 2 sq. rods. Find the cost of fencing it at $93\frac{1}{8}$ cts. a rod.

12. A rectangular field is three times as long as it is wide, and its area is 34 acres 107 sq. rods. What would it cost to fence it at $62\frac{1}{2}$ cts. a rod?

13. A pasture, whose length is three times its breadth, contains 37 acres 155 sq. rods. What would it cost to fence it at $87\frac{1}{2}$ cts. a rod?

14. A meadow, whose length is four times its breadth, contains 46 acres 36 sq. rods. How much would it cost to build a fence around it at 75 cts. a rod?

15. A farm containing 60 acres 147 sq. rods is three

times as long as it is wide. Find cost of fencing it at $.85 a rod.

16. The base of a right-angled triangle is 160; the perpendicular, 168. Find the hypotenuse.

17. The perpendicular of a right-angled triangle is 207; the hypotenuse, 305. Find the base.

18. The hypotenuse of a right-angled triangle is 306; the base, 144. Find the perpendicular.

19. A boy is flying a kite which is 203 yds. high. From a point directly beneath the kite to where the boy stands is 396 yds. How long is the string?

20. A boy is flying a kite whose string is 557 ft. long. From where the boy stands to a point directly beneath the kite is 532 ft. How high is the kite?

21. A boy is flying a kite whose string is 325 yds. long. If the kite is 204 yds. above the ground, how far is it from a point directly beneath the kite to where the boy stands?

22. A skiff, in crossing a river 736 yds. wide, landed at a point on the opposite side 273 yds. below the place from which it started. How far did it go in a straight line?

23. A tree was broken by the wind in such a way that the top struck the ground at a distance of 24 ft. from the foot of the tree. If the part left standing was 45 ft high, how long was the broken part?

24. A tree was broken in such a way that the top struck the ground at a distance of 50 ft. from the foot of the tree. If the broken part was $72\frac{1}{2}$ ft. long, how high was the part left standing?

25. A tree broke off in such a way that the top struck the ground at a distance of 33 ft. from the foot of the tree. If the broken part was 65 ft. long, how high was the tree at first?

26. Three towns, A, B, and C, are so situated that A is 168 miles directly south of B, and C is 95 miles directly east of A. What is the shortest distance from B to C?

27. A line $75\frac{5}{7}$ ft. long extends from the eaves of a house 40 ft. high, to the base of a building on the opposite side. How wide is the street?

28. A ladder reaches from the eaves of a house $33\frac{1}{3}$ ft. in height to a point in the street which is 25 ft. from the foundation of the house. How long is the ladder?

29. A ladder 45 ft. long touches a window 36 ft. high on one side of a street, and, without moving it at the foot, it reaches another window 27 ft. high on the opposite side. How wide is the street?

30. A ladder 34 ft. long touches a window 30 ft. high on one side of a street, and without moving it at the foot it reaches another window 16 ft. high on the opposite side. How wide is the street?

31. A travels due north 288 miles, and B due east 175 miles. If the surface of the earth were level, how far apart would they then be?

32. Two men start from the same point. One travels due south at the rate of 35 miles a day. The other due west at the rate of 84 miles per day. How far apart in a straight line will they be at the end of a week?

33. Two vessels sail from the same port. One sails due west at the rate of 56 miles a day, and the other due north at the rate of 90 miles a day. If the surface of the water were level, how far apart would they be in 6 days?

34. What distance would be saved by following the diagonal instead of two sides of a rectangular lot 120 yds. long and 64 yds. wide?

35. What distance would be saved by walking along the diagonal instead of two sides of a rectangular field 60 rods long by 32 rods wide?

36. What distance would be saved by walking along the diagonal instead of two sides of a rectangular field 55 rods long and 48 rods wide?

37. How much more fence would be required for a pasture 42.25 rods long and 12.25 rods wide, than for a square lot of equal area?

38. How much more fence would be required for a lot 28 rods wide and 63 rods long, than for a square lot of equal area?

39. A mast 70 ft. high stands in the center of a vessel 48 ft. wide. How long a rope will reach from the top of the mast to the edge of the deck?

40. A string 52 ft. long extends from the top of a center-pole to a point in the circumference of a circus-ring which is 40 ft. in diameter. How high is the center-pole?

41. How much farther would a man walk by taking two sides instead of the diagonal of a rectangular field 77 rods long and 36 rods wide?

42. How much more fence would be required for a meadow 80 rods long and 45 rods wide, than for a square meadow of equal area?

43. What distance would be saved by walking along the diagonal instead of two sides of a rectangular field 91 rods long and 60 rods wide?

44. Two vessels sail from the same port; one sails due north 65 miles a day, the other due east 72 miles per day. If the surface of the water were level, how far apart would they be at the end of 7 days?

45. A farm in the form of a rectangle: its length is 108 rods and its area 32 acres 64 sq. rods. How much more fence would it require than a square farm of equal area?

46. A pile of wood is 240 ft. long, 16 ft. wide, and 15 ft. high. Find its diagonal.

47. A rectangular solid is 12 ft. wide, 11 ft. high, and 132 ft. long. What is the length of its diagonal?

48. A water-tank is 8 ft. deep, 9 ft. wide and 72 ft. long. What is the shortest distance from a right-hand upper corner to a left-hand lower corner?

49. A room is 29 ft. square and 14 ft. 6 in. high. Find length of its diagonal.

50. A cellar is 33 ft. square and 16 ft. 6 in. deep. Find the length of its diagonal.

51. The diagonal of a square field is 96 rods. What is its area?

52. The diagonal of a square pasture is 78 rods. What is its area?

53. The diagonal of a square field is 75 rods. What would be the diagonal of another square field, whose area is four times as great?

## Article 244.

### Cube Root.

*Extract the cube root of*

1. 17576.
2. 29791.
3. 54872.
4. 103823.
5. 166375.
6. 328509.
7. 389017.
8. 551368.
9. 830584.
10. 1331000.
11. 6967871.
12. 19248832.
13. 45499293.
14. 106496424
15. 244140625.
16. .024389.
17. .000300763.
18. .094818816.
19. 970.299.
20. 476379.541.
21. 36.926037.
22. .000000001.
23. 7.12.
24. $\frac{2197}{6859}$.
25. $\frac{456533}{804357}$.
26. $\frac{10303031}{1367631}$.
27. $\frac{314432}{912673}$.
28. $7762\frac{49}{125}$.
29. $1656\frac{216}{216}$.
30. $1229\frac{328}{343}$.

31. $\sqrt[3]{15\times 21\times 49\times 75}=?$

32. $\sqrt{6544.81}-\sqrt[3]{941.192}=?$

33. Extract the sixth root of 1.771561.

34. Extract the sixth root of 2985984.

35. Extract the ninth root of 10077696.

36. $\sqrt[3]{(40353607)^{\frac{1}{3}}}=$ what?

37. $\sqrt{(531441)^{\frac{1}{3}}}=$ what?

38. $\sqrt[3]{(531441)^{\frac{1}{4}}}=$ what?

39. $\sqrt[3]{658.503}+\sqrt[3]{12\frac{167}{1000}}+\sqrt[3]{166375}=$ what?

40. $\sqrt[3]{3^6\times 4^3\times 2^9}=$ what?

## Article 245.

1. A rectangular mound is 168 ft. long, 126 ft. wide, and 28 ft. high. If it were in the form of a cube, what would be the length of one edge?

2. A cubical box contains 91 cu. ft. 216 cu. in. What is the length of one edge?

3. A party of speculators purchased a tract of land for $79507. If the number of men, the number of acres each received, and the number of dollars paid per acre, were all equal, what was the price per acre?

4. A cellar is 36 ft. long, 27 ft. wide, and 6 ft. deep. What would be the width of a cubical cellar of equal capacity?

5. A pile of wood is in the form of a rectangular solid, 48 ft. wide, 36 ft. high, and 216 ft. long. If it were piled in the shape of a cube, what would be the length of one edge?

6. The pedestal of a monument is a cubical block of granite, containing 287496 cu. in. What is the area of the base?

7. A cubical block of stone contains 300763 cu. in. What is the area of its faces?

8. The solid contents of a cubical block are 474552 cu. in. What is the area of its faces?

9. The solid contents of a cubical block of granite are 74088 cu. in. What would be the cost of polishing five of its faces at $1.40 a square foot?

10. A cubical block of marble contains 274.625 cu. ft. Find the cost of polishing its faces at 30 cts. a square foot.

11. A cubical block of wood contains 5832 cu. in. How much would it cost to gild five of its faces at 1 ct. a square inch?

12. The solid contents of a cubical block of granite are 79.507 cu. ft. What will it cost to polish five of its sides at $1.20 a square foot.?

13. Two cubes contain respectively 42.875 cu. ft. and 91.125 cu. ft. What is the difference in the entire area of their faces?

14. A cubical bin holds exactly 17.64 bu. If the bushel contains 2150.4 cu. in., what is the length of one side of the box?

15. The cost of polishing five sides of a cubical block of marble, at 24 cts. a square foot, was $14.70. What were its solid contents?

16. A regular solid is square at the ends, and is three times as long as it is wide. If it contains 24 cu. ft., what are its dimensions?

17. A rectangular solid is square at the ends, and its length is four times its height. If it contains 62.5 cu. ft., what are its dimensions, and what is the entire area of its surface?

18. A rectangular solid is square at the ends, and its length is three times its width. If the entire area of its surface is 31.5 sq. ft., what are its solid contents, and its dimensions?

19. How many 3-inch cubes could be placed in a cubical box which is 18 in. deep?

20. A cubical box contains 27000 half-inch cubes. What is the depth of the box?

21. A river is 880 miles long. If it has an average width of 2640 ft. and a depth of 12 ft., what would be the depth of a cubical pit that would exactly contain all the water in the river?

---

# MENSURATION.

ARTICLE 247.

## Areas of Parallelograms.

1. Find the difference in area between a floor 39 ft. square and two others each 36 ft. long and 21 ft. wide.

2. How many acres in a parallelogram 72 rods wide and 96 rods long?

3. How many acres in a square field, each side of which is 75 rods in length?

4. How many acres in a field in the form of a rhombus, each side measuring 50 rods, and the perpendicular between opposite sides 32 rods?

5. How many thousand feet of lumber will inclose the sides of a barn 60 ft. long, 40 ft. wide, and 20 ft. high to the eaves?

6. How many tiles 10 in. wide and 16 in. long would cover the floor of a dining room 37 ft. 6 in. long and 26 ft. 8 in. wide?

7. A roof is 40 ft. long, and 15 ft. wide on each side. Find the cost of slating it at $7.50 per square (a square equals 100 sq. ft.).

8. A parlor 18 ft. wide requires 64 yds. of Brussels carpet ($\frac{3}{4}$ yd. wide). How long is the parlor?

9. The slate blackboard in a school-room is 33 ft. 4 in. long by 4 ft. 6 in. wide. What did it cost, at $33\frac{1}{3}$ cts. a square foot?

10. How many more square yards of carpet would be required for a room 20 ft. 3 in. long by 17 ft. 4 in. wide than for a room 16 ft. 8 in. long, 13 ft. 6 in. wide?

11. How many yards of Brussels carpet ($\frac{3}{4}$ yd. wide) are required to cover the floor of a room 22 ft. 6 in. long and 16 ft. 6 in. wide?

12. An inclosure is 55 rods long, and contains 11 acres. What would be the cost of a tight board fence 5 ft. high surrounding it, at $1.60 per hundred feet?

13. How much more fence would be required for a farm 108 rods long and 75 rods wide than for a square lot of equal area?

14. A square room contains 25 sq. yds. of carpet. If each side were 6 ft. longer, how many yards would cover the floor?

15. The fence around a square pasture measures 192 rods. Find area of pasture.

16. A man owning a lot 81 rods long by 48 rods wide, exchanged it for another lot of equal area, whose length was three times its width. How much more fence did the latter require?

## Articles 248.

### Area of Trapezoids.

1. A floor is 28 ft. long, and its two ends are 19 ft. and 16 ft. wide. What is its area?

2. Find the area of a field in the form of a trapezoid, the parallel sides being 49 rods and 37 rods in length, and lying 40 rods apart.

3. A lot is bounded by four streets. Two of them

are parallel, and measure 130 ft. and 150 ft. along the lot, and are 120 ft. apart. What is the area of the lot?

4. A town lot is 75 ft. wide in front, 55 ft. in the rear, and 160 ft. deep. Find its value, at 5 cts. a square foot.

5. A field in the shape of a trapezoid measures 67 rods and 53 rods along its parallel sides, and is 75 rods long. What is its value, at $80 per acre?

6. A floor is 18 ft. wide at one end, 15. ft. at the other, and its area is 44 sq. yds. What is the length of the floor?

7. A field in the form of a trapezoid is 60 rods long, and its area is 16 acres 20 sq. rods. If one of its parallel sides is 48 rods long, what is the length of the other?

8. A town lot is 150 ft. deep, and its area is 1000 sq. yds. If one of its parallel sides is 40 % longer than the other, what is the length of each?

9. A city lot in the form of a trapezoid cost $2250, at 40 cts. a square foot. If its parallel sides were 39 ft. and 51 ft., what was its length?

10. A farm in the shape of a trapezoid 96 rods long, cost $4050, at $100 per acre. If one of its parallel sides was 25 % longer than the other, what were their respective lengths?

## ARTICLE 249.

### Areas of Triangles.

1. A triangle is 27 ft. long and 22 ft. high. What is its area?

2. The base of a triangle is 19 yds., and its altitude 32 yds. Find its area.

3. A triangle has a base of 70 rods, and an altitude of 43 rods. What is its area?

4. The perpendicular of a triangle is 121 ft., its base $62\frac{1}{2}$ ft. Find its value, at 8 cts. a square foot.

5. A meadow in the form of a right-angled triangle cost $720, at $75 per acre. If the base was 64 rods long, what was the length of the other two sides?

6. The sides of a triangle are 28 ft., 53 ft., and 45 ft. respectively. What is its area?

7. The sides of a triangular field are respectively 39, 52, and 65 rods. Find its area.

8. The sides of a triangular garden are 48, 55, and 73 yds. What is its area?

9. The sides of a triangular meadow are respectively 65, 72, and 97 rods. How many acres does it contain, and what is it worth, at $80 per acre?

10. The edges of a triangular sail are 24, $27\frac{1}{2}$, and $36\frac{1}{2}$ ft. What did it cost, at 45 cts. a square yard?

11. Two lawns are in the form of right-angled triangles. The hypotenuse of the first is 193 ft., base 95 ft. The hypotenuse of the second is 194 ft., perpendicular 144 ft. Find the difference in the cost of sodding the two lawns, at 18 cts. a square yard.

12. A line 58 ft. long attached to a peg driven in the ground between two trees whose heights are respectively 42 ft. and 40 ft., will exactly reach the top of each. What is the difference in the area of the two triangular spaces?

13. A pole 39 ft. high stands at one of the vertices of an equilateral triangle. A rope 89 ft. in length attached to the top of the pole will just reach either of the other vertices. What is the area of the triangle?

ARTICLE 250.

## Area of Trapezia.

1. What is the area of trapezium whose diagonal is 130 ft., and the perpendiculars to the diagonal respectively 56 ft. and 70 ft.

2. The diagonal of a lot in the form of a trapezium is 121 yds., and the perpendiculars to the diagonal are respectively 39 and 21 yds. How many square rods does it contain?

3. A line forming the diagonal of a parlor in the shape of a trapezium is 27 ft. long, and the perpendiculars to this diagonal are 11 ft. and 13 ft. respectively. What would it cost to cover the floor with Brussels carpet, at $1.25 a yard?

4. A brickyard is in the form of a trapezium whose diagonal is 363 ft. The perpendiculars to the diagonal are respectively 90 and 108 ft. What is its area?

5. I paid 25 cts. a square foot for a town lot in the shape of a trapezium, whose diagonal was 140 ft., and the distances from this diagonal to the vertices of the opposite were respectively 30 ft. and 48 ft. How much did it cost?

6. $100 per acre was paid for a farm in the shape of a trapezium, whose diagonal was 165 rods, and the perpendiculars to the diagonal 44 rods and 52 rods. What was the cost of the farm?

7. The sides of a field are respectively 216, 63, 135, and 180 rods, of which the first two form a right angle. What is the area of the field?

8. A farm is in the shape of a trapezium, whose sides are respectively 111, 148, 176, and 57 rods in length. the last two forming a right angle. How many acres does it contain?

9. A lot is bounded by four streets, and its sides are respectively 200, 234, 88, and 150 ft., of which the second and third form a right angle. Find its value, at $12\frac{1}{2}$ cts. a square foot.

10. $80 per acre was paid for a farm in the shape of a trapezium, whose sides were 104, 112, 78, and 66 rods, the second and fourth lying at right angles. Find the value of the farm.

## Article 251.

### Diameters and Circumferences of Circles.

1. The diameter of a circle is 125 ft. What is the distance around it?

2. The diameter of a circular race-course is 750 yds. Find its circumference.

3. The circumference of a circular fish-pond is 424.116 ft. What is its diameter?

4. The circumference of a circus-ring is 209.44 ft. Find the greatest distance across it.

5. A straight line from side to side through the center of a circular race-course is 840 ft. 4 inches. What is the distance around it?

6. A wagon-wheel travels 471.24 yds. in making 100 revolutions. What is its diameter?

7. The fly-wheel of an engine is 12.5 ft. in diameter. What distance would it travel in making 1000 revolutions?

8. The round-house of a certain railroad is 353.43 ft. in circumference. What is the distance between two points on opposite sides of its center?

9. The dome of a church in St. Petersburg is 150 ft. in diameter. What would be the cost of painting its base, at 25 cts. a linear foot?

10. A boy attached a string to a peg in a playground, and with the other end ran around the peg. If the greatest distance that he could run in going around once was 157.08 ft., how long was the string?

11. A line 58 ft. long extends from the top of a center-pole 42 ft. high, to the edge of a circus-ring. What is the circumference of the ring?

12. A string $62\frac{1}{2}$ ft. long is attached to the top of a pole 50 ft. high. How far would a boy walk if he followed the circumference of the circle described by the end of the string around the pole?

13. If the moon is 240000 miles from the earth, how long would it require a bird flying at the rate of 40 miles an hour to complete the circuit of the moon's orbit, supposing the latter to be the circumference of a circle, and allowing $365\frac{1}{4}$ days to the year?

### ARTICLE 252.

### Areas of Circles.

1. The diameter of a circle is 75 ft. What is its area?

2. The circumference of a circular field is 1900.668 yds. What is its area?

3. The radius of a circle is 55 yds. What is its area?

4. A circular picture-gallery is 157.08 ft. in circumference. What would be the cost of carpeting the floor, at $1.20 a square yard?

5. The circular space under the dome of a church is 60 ft. in diameter. What would it cost to pave it with marble tiles, at 25 cts. a square foot?

6. A horse is tied to a stake by a rope which permits him to graze over 7088.235 sq. ft. How long is the rope?

7. The area of a circular lot is 16513.035 sq. ft. What is the length of a rope that will just allow a horse to graze over it?

8. A cow is tied to a stake by a rope 75 ft. long. Over what area can she graze?

9. I wish to construct a circular fishpond 125 ft. in diameter and 4 ft. deep. What will the excavation cost, at $.18 a cubic yard?

10. A circular fair-ground is a half mile in diameter. Find its value, at $125 per acre; also the cost of the fence surrounding it, at $1.87½ per rod.

11. What is the area of a circular park whose circumference is a race-track 1 mile in length?

12. A rope 125 ft. long extends from the top of a center-pole 75 ft. high, to the edge of a circular tent. What is the area of the inclosed space?

13. A flag-pole 93.75 ft. high stands in the center of an amphitheater whose area is 1 acre 5527.5 sq. ft. How long is the rope which extends from the top of the pole to a point in the circumference of the inclosed space?

14. A circular tower, whose base is 50 ft. in diameter, stands in the center of a circular park whose circumference is 1570.8 ft. What is the area of the space outside of the tower?

## MENSURATION OF SOLIDS.

### ARTICLE 254.

### Surface of Prism or Cylinder.

1. Find the surface of a right prism 5 ft. high, standing on a triangular base whose sides are 20, 21, and 29 inches.

2. Find the surface of a right prism 5 ft. 7 in. high,

standing on a triangular base whose sides are 15, 20, and 25 inches.

3. What is the surface of a rectangular prism 6 ft. high, standing on a base 3 ft. square?

4. What is the surface of a rectangular prism 4 ft. 3 in. high, standing on a base 2 ft. 6 in. square?

5. Find the convex surface of a cylinder 25 in. high and 10 in. in diameter.

6. Find the entire surface of a cylinder 5 ft. long and 25 in. in diameter.

7. Find the entire surface of a cylinder 5.236 ft. in circumference, and 4 ft. 2 in high.

## ARTICLE 255.

### Volume of Prisms or Cylinders.

1. How many cubic inches in a prism 15 in. high, standing on a base 3 in. square?

2. A prism 25 in. high stands on a triangular base whose sides are 8 in., 15 in., and 17 in. What are its solid contents?

3. Find the volume of a marble base 2 ft. 6 in. long, 1 ft. 4 in. wide, and 9 in. high.

4. A granite column is 13 ft. 4 in. high, and its base is 18 in. square. What is its value, at $\$6.66\frac{2}{3}$ a cubic foot?

5. Find the solid contents of a cylinder whose diameter is 15 in., and height 5 ft.

6. What is the volume of a cylinder 78.54 in. in circumference, and 3 ft. 4 in. high?

7. One of the columns of a temple is 13.09 ft. in circumference, and its volume is 818.125 cu. ft. What is its height?

Find the Volume of a Cyl.
(Area of Base by) (alt.)

## Article 256.

### Surface of Pyramid or Cone.

1. Find the convex surface of a right pyramid, whose base is 15 in. square, and its slant height 6 ft.

2. What is the convex surface of a right pyramid, whose slant height is 8 ft., if it stands on a triangular base, each side of which is 27 in.?

3. Find the entire surface of a right pyramid standing on a base 30 in. square, its slant height being 10 ft.

4. Find the entire surface of a pyramid whose slant height is 9 ft., standing on a triangular base whose sides are 16, 30, and 34 in.

5. Find the convex surface of a cone, the radius of the base being 5 in., and its slant height 25 in.

6. Find the entire surface of a cone whose base is 25 in. in diameter, and its slant height 5 ft.

7. The base of a cone is 4 ft. 2 in. in diameter, and its slant height is 6 ft. 3 in. What is its entire surface?

## Article 257.

### Volume of Pyramid or Cone.

1. Find the volume of a pyramid 33 ft. high, standing on a base 9 ft. square.

2. The height of a pyramid is 16 ft., and its base is a triangle whose sides are 27 in., 36 in., and 45 in. What is its volume?

3. A pyramid stands on a base 99 ft. square, and its volume is 18150 cu. yds. How high is it?

4. A pyramid 108 ft. high stands on a triangular base whose sides are 40, 42, and 58 ft. What is its volume?

5. Find the volume of a cone whose base is 5 ft. in diameter, and whose altitude is 30 ft.

6. Find the volume of a cone whose base is 7.854 ft. in circumference, and whose altitude is 12 ft.

7. The radius of the base of a cone is 37.5 in., and its volume is 272 cu. ft. 1224 cu. in. What is its altitude?

ARTICLE 258.

## Surface of a Sphere.

1. Find the surface of a sphere whose diameter is 25 in.

2. Find the surface of a sphere whose radius is 15 in.

3. A ball surmounting the spire of a cathedral is five feet in diameter. What would be the cost of gilding it, at $.005 a square inch?

4. How much rubber cloth would be required for 600 foot-balls, each ten inches in diameter?

5. How many globes eight inches in diameter would equal in surface a globe whose diameter is 40 in.?

ARTICLE 259.

## Volume of a Sphere.

1. Find the volume of a sphere eight feet four inches in diameter.

2. The interior of a glass globe is 15 in. in diameter. How many gallons will it contain?

3. How many marbles $\frac{1}{2}$ inch in diameter would be equal in volume to a marble ball one foot in diameter?

4. If a cubic inch of copper is worth five cents, what would be the value of a solid ball of copper 12.5 in. in diameter?

5. The volume of a globe is 37 cu. ft. 1514 cu. in. What is its diameter?

ARTICLE 261.

## Board Measure.

1. How many feet in a board 18 ft. long, 10 in. wide, and 1 in. thick?

2. A farmer bought 440 fence-boards 15 ft. long and 6 in. wide, at $12.50 per thousand feet. What did they cost?

3. A corporation bought 225 bridge-planks 2 in. thick, 18 ft. long, and 9 in. wide. How much did they cost, at $24 per thousand feet?

4. Four sills under a foundation are each 32 ft. long, 15 in. wide, and 8 in. thick. What is their value, at $2.50 per hundred feet?

5. How many feet in a 3-inch plank, 16 ft. long, 15 in. wide at one end, and 11 in. at the other?

6. A hewed log is 24 ft. long, 22 in. wide at one end, 18 in. at the other, and 16 in. thick. What is its value, at $2\frac{3}{4}$ cts. a foot?

ARTICLE 262.

## Masons' and Bricklayers' Work.

1. How many perches in a pile of stone 165 ft. long, 50 ft. wide, and 3 ft. high?

2. A cellar is 7 ft. 6 in. deep, and 54 ft. long by 41 ft. wide inside. If the walls are 2 ft. thick, how many perches of stone will they require?

3. A cellar is 8 ft. 3 in. deep, 45 ft. long, and 30 ft. wide, outside measurement. If the walls are 18 in. thick, what did the foundation cost, at $\$3.33\frac{1}{3}$ a perch?

4. How many bricks 8 in. long, 4 in. wide, and 2 in. thick, can be piled in a box car 32 ft. long, 6 ft. 8 in. wide, and 2 ft. deep, inside measurement?

5. The front of a court-house is supported by five brick columns, each 2 ft. 6 in. in diameter, and 32 ft. high. Allowing 20 bricks to the cubic foot, what was their cost, at $10 per thousand?

6. A chimney is 45 ft. high, 4 ft. 4 in. by 2 ft. 8 in. outside, and 3 ft. by 16 in. inside. What did the brick cost, at $12.50 per thousand, allowing 20 to the cubic foot

ARTICLE 263.

### Measurement by Bushels or Gallons.

1. How many bushels in a bin 21 ft. long, 10 ft. 8 in. wide, and 5 ft. deep?

2. How many bushels in crib 12 ft. square and 7 ft. deep?

3. A transfer wagon is 10 ft. long, 5 ft. wide, and 2 ft. 4 in. deep, inside measurement. How much grain will exactly fill it?

4. A box car is 35 ft. long, 5 ft. 4 in. wide, and 3 ft. deep in the clear. What is its capacity in bushels?

5. How much grain will fill a cylindrical vessel 11 ft. deep. and 5 ft. in diameter?

6. How many gallons will exactly fill the vessel in the preceding question?

7. A vat is 15 ft. 9 in. long, 11 ft. wide, and 7 ft. deep. What is its capacity either in gallons or barrels?

8. A reservoir is 189 ft. long, 105 ft. wide, and 22 ft. deep. How many barrels of water will it hold?

9. A cistern is 10 ft. in diameter and 25 ft. deep How many gallons will fill it?

10. A box is 14 ft. long, 11 ft. wide, and 4 ft. deep What is its capacity in cubic feet, gallons, or bushels?

# PROGRESSIONS.

## ARTICLE 265.

### Arithmetical Progression.—Case I.

1. The first term of an increasing series is 50; the common difference 40; and the number of terms 30. What is the last term?

2. The first term of a decreasing series is 1897, the common difference 48, and the number of terms 40. What is the last term?

3. The first term of an increasing series is $\frac{4}{5}$, the common difference $\frac{1}{2}\frac{6}{5}$. Find the 101st term.

4. The first term of a decreasing series is 399, the common difference .8. What is the 376th term?

5. A man accomplished a journey in 15 days, going 9 miles the first day, and increasing the distance traveled each successive day by $1\frac{1}{2}$ miles. How far did he travel the last day?

6. A boy agreed to work 51 days, at 25 cts. for the first day, and an increase of 2 cts. per day for every day thereafter. What did he earn on the last day?

7. A man rented a house for a year, agreeing to pay $5 for the first month, and an increase of $2.50 per month for each successive month. What was the last month's rent?

## ARTICLE 266.—CASE II.

1. The first term of a series is 11, the last term 106, and the number of terms 20. What is the common difference?

2. The extremes are 25 and 385; the number of terms 16. What is the common difference?

3. The first term is $\frac{3}{4}$, the last term $66\frac{3}{4}$, and the number of terms 100. Find the common difference.

4. The extremes are 7.5 and 229; the number of terms 444. What is the common difference?

5. A man dying, left his property to eleven children. The oldest received $2250, and each successive child a certain amount less than his predecessor. If the youngest received $1000, what was the common difference?

6. A pedestrian traveled a certain distance in 25 days. The first day he traveled 8 miles, and increased his daily rate a certain number of miles. What was his daily increase if he traveled 50 miles on the last day?

7. A farmer sold a drove of hogs at $1 for the first hog and $16 for the last. If there were 101 hogs in the drove, what was the rate of increase?

## Article 267.—Case III.

1. The extremes are 12 and 204; the number of terms 25. Find the sum of the series.

2. The extremes are 15 and 171; the number of terms 48. Find the sum of the series.

3. Extremes, 41 and 231; number of terms 39. What is the sum of the series?

4. The first term is 80; common difference .7. What is the sum of 101 terms of a decreasing series?

5. The 1000th term of an increasing series is 673; the common difference is $\frac{2}{3}$. What is the sum of the 1000 terms?

6. The first term is 4; the 40th 277. What is the sum of the series if there are 50 terms?

7. There are 143 apples in a right line, 5 ft. apart. If the first is 5 feet from a basket, how far will a boy walk who gathers them singly and places them in the basket?

8. A man agreed to work 310 days in a certain year at 1 ct. for the first day, 3 for the second, 5 for the third, and so on. What did he receive for his year's work?

9. A father divided his property among his 10 children, giving the oldest $3000, and each successive child $250 less than his predecessor. What was the value of the property?

10. A merchant engaged in business for 21 yrs. His original capital was $8000. He gained $500 the first year, and increased his profits by $150 each successive year thereafter. How much had he on retiring from business?

### Article 269—Case I.

### Geometrical Progression.

1. The first term of an increasing geometric series is 8; the ratio, 4. What is the fifth term?

2. The first term of an increasing geometric series is 7; the ratio, 9. What is the fifth term?

3. The first term of a decreasing geometric series is 7; the ratio, 3. Find the sixth term.

4. The first term of an increasing geometric series is $\frac{64}{81}$; the ratio, $\frac{3}{2}$. Find the seventh term.

5. The first term of a decreasing geometric series is 128; the ratio, 2. What is the tenth term?

6. The first term of an increasing geometric series is 729; the ratio, $3\frac{1}{3}$. What is the seventh term?

7. The first term of a decreasing geometric series is 3125; the ratio, $\frac{5}{4}$. What is the eighth term?

8. Find the compound amount of $1000 for six years at 10 %.

ARTICLE 270. — CASE II.

1. Find the sum of 12 terms of an increasing geometric series whose first term is 1, and ratio is 2.

2. Find the sum of 7 terms of an increasing series whose first term is 4, and the ratio 3.

3. Find the sum of 20 terms of a decreasing series whose first term is 2621440, and ratio 2.

4. Find the sum of an infinite decreasing series whose first term is $\frac{4}{5}$, and ratio $\frac{5}{4}$.

5. Find the sum of 10 terms of an increasing series whose first term is 25.6, and ratio 1.5.

6. Find the sum of an infinite decreasing series, of which the first term is 5.76, and the ratio 1.2.

7. If the profits of a mining company were $500 the first year, $1000 the second, and so for 12 years, what were their total profits?

---

# MISCELLANEOUS PROBLEMS.

1. A jockey sold a horse for $131.25, and thereby gained as many percent as the number of dollars he paid for it. What did the horse cost?

2. A man sold a watch for $22.75, thereby losing as many percent as the watch cost in dollars. What did he pay for it?

3. A tree 96 feet high was broken by the wind in such a manner that the top struck the ground 36 ft. from the foot of the tree. How high was the stump?

4. A tree 120 ft. high was broken in such a way that the top struck the ground 48 ft. from the foot of the tree. How long was the part broken off?

5. Bought eggs at 12½ cts. a dozen. Had I received

8 more eggs for the same money they would all have cost 2 cts. per dozen less. How many eggs were bought?

6. Bought eggs at $13\frac{1}{3}$ cts. a dozen. Had I received 5 eggs fewer for the same money they would have cost $1\frac{2}{3}$ cts. more per dozen. How many eggs were bought?

7. The diagonal of a regular parallelopipedon is 21 in. What is its entire surface? (Infinite number of answers.)

8. The floor of a room is square, and the length of one side is twice the height of the ceiling. If the length of the longest line that can be stretched inside is 33 ft. 9 in., what are the dimensions of the room?

9. If the cost of an article had been 8 % less, the gain would have been 10 % more. Find the percent of gain.

10. If the cost had been $16\frac{2}{3}$ % more, the gain would have been $18\frac{3}{4}$ % less. What was the percent of gain?

11. If the cost had been 15 % more, the loss would have been 12 % more. Find the percent of loss.

12. If the cost had been $6\frac{2}{3}$ % less, the loss would have been $6\frac{1}{4}$ % less. Find the percent of loss.

13. Two circles, each 20 ft. in diameter, are placed in such a way that the circumference of each just touches the center of the other. What is the area of the space between their centers?

(NOTE.—Multiply the area of one circle by .391, or, for greater accuracy, by .3910022.)

14. The sides of a lot in the form of a trapezium are respectively 176, 57, 111, and 148 ft. in length. If the first two and the last two sides form right angles, what is the area of the lot?

15. The entire surface of a cube is 1 sq. ft. 6 sq. in. What is the surface of another cube whose volume is 64 times as great?

16. By discounting a sixty-day note at $\frac{2}{3}$ % a month I paid $.49 above true interest. What was the face of the note?

17. A concert-hall is 72 ft. long, 38 ft. wide, and 16 ft. high. What is the shortest distance that a spider can crawl by floor and wall from a northwest lower corner to southeast upper corner?

18. A lot 30 rods long is in the form of a trapezoid, 17 rods wide at one end and 7 rods wide at the other. How far from the larger end must a fence be placed straight across that the two parts may be of equal area?

19. A man borrowed $5000, which he agreed to repay in five equal annual installments, including interest at $6\frac{2}{3}$ %. What was the amount of each installment?

20. There is coal now on the dock, and coal is running on at a uniform rate from a chute. 8 men can clear the dock in one hour, and 12 men can clear it in 24 min. How long would it take 6 men? 7 men? 16 men?

21. A speculator sold two houses at the same price each, gaining 15 % on one, losing 8 % on the other. If he gained $110 on the transaction, what was the cost of each house?

22. How many acres are there in a square tract which contains as many acres as there are boards in the fence surrounding it, if the boards are 12 ft. long, and the fence is 4 boards high?

23. What is the side of a square whose area is three times as great as that of an equilateral triangle whose sides are 100 ft. in length?

24. A merchant imported wine at $2.80 a gallon. 9 % was lost by leakage. At what price per gallon must he sell the remainder to gain 30 % on the cost of all?

25. A, B, C, and D, whose ages were respectively 19, 17, 15, and 13 yrs., inherited $13750, which was so divid-

ed that their respective shares, at 10 % simple interest, amounted to equal sums when they arrived at the age of 21 yrs. What was the share of each?

26. An island is 75 miles in circumference. Five men whose rates of traveling are respectively $7\frac{1}{2}$, $8\frac{1}{3}$, $9\frac{3}{8}$, 10, and $12\frac{1}{2}$ miles per hour, start from the same place at the same time, and ride in the same direction around it. If they travel 12 hrs. per day, in how many days will all first arrive at the starting place?

27. What is the greatest number that will divide 1166, 1558, and 2244, and leave the same remainder in each case?

28. A man, dying, left $23500 to be divided among his widow, son, and daughter, on condition that if the daughter died and the son survived, he should have $\frac{5}{8}$ of the money, and the widow $\frac{3}{8}$ of it. But if the son died and the daughter lived, she should have $\frac{5}{9}$ of the money, and the widow $\frac{4}{9}$ of it. Both son and daughter survived. What did each of the heirs receive?

29. 4 apples are worth as much as 5 plums; 3 pears are worth as much as 7 apples; 8 apricots are worth as much as 15 pears. If 5 apples sell for 2 cts., what is the smallest whole number of cents that will buy an equal number of each of the four kinds of fruit?

30. (*a*) A rectangular bin contains exactly 476.28 bu. of wheat. If its length, breadth, and depth have the ratios of 4, 3, and 2.25, what are the dimensions of the bin?

(*b*) If the above-mentioned bin were cubical in form, what would be its depth?

# ANSWERS.

## Article 19.

1. 1926.
2. 2336.
3. 3171.
4. 4169.
5. 4189.
6. 3575.
7. 36155.
8. 30089.
9. 34059.
10. 37168.
11. 28514.
12. 37820.
13. 400000.
14. 241910.
15. 359366.
16. 433329.
17. 212733.
18. 196139.
19. 3714924.
20. 4453230.
21. 4272505.
22. 4238831.
23. 4552041.
24. 703949.
25. 3778786.
26. 4470081.
27. 1900206.
28. 54390626.
29. 57134515.
30. 49842909.
31. 45454545.
32. 30832643.
33. 7586821.
34. 21946663.
35. 53798.
36. 49749.
37. 436036.
38. 461415.
39. 4756308.
40. 6519143.
41. 5227660.
42. 31962960.
43. $10000.
44. 2412 yds.
45. 124255 bu.
46. 200000 bricks.
47. 108053 gal.
48. 21700 bls.
49. 64000 acres.
50. 175411 lb.
51. $773711.
52. 100000 sq.yds.
53. 11111 cords.
54. 314935.
55. 799992.
56. 10234 lb.
57. 3817 miles.
58. 5904 pupils.
59. 6850.
60. $20000.
61. 47216.
62. 72080 bu.
63. $2302370.
64. 141465 ft.
65. 50000 bls.
66. 99999 men.
67. $100000.
68. 1352180 sq. miles.
69. 6640927.
70. 63174506 ba.
71. 32044021.
72. $18407545073
73. $1000000.
74. 25504 bu.; 1475640 cts.
75. $30075.

## ARTICLE 26.

1. 111.
2. 1097.
3. 6789.
4. 41976.
5. 199980.
6. 3456789.
7. 4444444.
8. 8999109.
9. 18889198.
10. 29053089.
11. 102230606.
12. 9999999.
13. 81726355.
14. 798989799.
15. 1887188718.
16. 80808
17. 101254.
18. 360716.
19. 5790114.
20. 91223642.
21. 1538226086.
22. 1176503597.
23. 471808999.
24. 93251780.
25. 301302303.
26. 2461875203.
27. 2334455667.
28. 987654321.
29. 90807060.
30. 8128342.
31. 900991.
32. 31409.
33. 88088088.
34. 555555.
35. 246913569.
36. 49273975.
37. 185541531.
38. 41876067.
39. 18834655.
40. 1234567890.
41. 903926904.
42. 93 yrs.
43. $1488.
44. 56791 bu.
45. 6392 bu.
46. 3783 miles.
47. 2859.
48. $106719.
49. 287677 bls.
50. $27846.
51. 198051 lb.
52. 151817.
53. 205088 letters.
54. 50559 ties.
55. 52474879 sq. miles.
56. $1790920187
57. 1111.
58. 2830.
59. 244.
60. 6938.
61. 10101.
62. 1300.
63. 18028.
64. 12250.
65. 1790.
66. 3353 bu.
67. $17625.
68. A $1250.
69. 7775 bu.
70. $25750.
71. 6250 bu.
72. $50000.
73. $4000.
74. $2925.
75. 124500.

## ARTICLE 31.

1. 1359.
2. 2508.
3. 2920.
4. 4776.
5. 6664.
6. 7032.
7. 21105.
8. 55335.
9. 114312.
10. 197208.
11. 300424.
12. 439002.

13. 598575.
14. 749925.
15. 1946848.
16. 3352999.
17. 5312551.
18. 14400000.
19. 24160500.
20. 37624971.
21. 51442898.
22. 48000000.
23. 40320000.
24. 55318501.
25. 75060000.
26. 97010021.
27. 23040000.
28. 24767012.
29. 56320000.
30. 59259204.
31. 36877848.
32. 77526952.
33. 30291840.
34. 11731392.
35. 8320000.
36. 12800000.
37. 48000000.
38. 52204731.
39. 56113056.
40. 89545692.
41. 234390000.
42. 531972441.
43. 400147164.
44. 974814498.
45. 128000000.
46. 454595945.
47. 769746978.
48. 838908992.
49. 505560000.
50. 100000000000.
51. $2000.
52. 9072 bars.
53. 67725 cts.
54. 74752 0 lb.
55. 320000 cts.
56. 9701 bu.
57. $51800.
58. 518400 gal.
59. 230400 sheets.
60. 204633 lb.
61. 207320 miles.
62. $121600.
63. 8751132 pages.
64. 192000000 sq. rods.
65. 1240987251 gallons.
66. 526848 ems.
67. 1507764 cts.
68. 1202688 hills.
69. 65280000 oz.
70. 4738500 cts.
71. 1181250 lb.
72. 10298448 cts.
73. 1445688 cu. ft.
74. 9000000 beans
75. 67392000 ft.

## Article 41.

1. 1862349.
2. 261854.
3. 3758461.
4. 4736258.
5. 5293846.
6. 6486039.
7. 7576775.
8. 839201.
9. 9876543.
10. 7968549.
11. 6708007.
12. 8099098.
13. 33366700.
14. 23456789.
15. 40506070.
16. 91827364.
17. 99999999.
18. 70990709.
19. 989796959.
20. 60800040.
21. 99887766.
22. 75062505.
23. 57863942.
24. 70300999.
25. 1234567890.
26. 625 bu.
27. 750 powders.

28. $1975.
29. 313 days.
30. 9849 chest's.
31. $31545.
32. 4329 kegs.
33. 12634 balls.
34. 30020 bricks.
35. 9991 ties.
36. 250025 ft.
37. 86400 sec.
38. 9099 marbles.
39. 109757 pass.
40. 3768 miles.
41. 6175 lb.
42. 1957230.
43. 13849 rev.
44. 18625 gal.
45. 237600 sq. ft.
46. 54243 nails.
47. 12345679 sq. yards.
48. 1430143.
49. 186000 miles.
50. $69865812.

## ARTICLE 42.

1. 3456.
2. 4538.
3. 5845.
4. 6273.
5. 7492.
6. 8074.
7. 9137.
8. 3201.
9. 5908.
10. 6347.
11. 15735.
12. 51073.
13. 36402.
14. 60041.
15. 74750.
16. 80706.
17. 91929.
18. 73901.
19. 68765.
20. 98007.
21. 39068.
22. 5625.
23. 68572.
24. 74391.
25. 47630.
26. $85429\frac{127}{945}$
27. 16000.
28. $98764\frac{532}{837}$
29. 31250.
30. $98798\frac{373}{987}$
31. 28356.
32. 36007.
33. $48056\frac{4566}{4567}$
34. 16384.
35. $68973\frac{5323}{6798}$
36. $18625\frac{1111}{7346}$
37. 75075.
38. 80056.
39. $10101\frac{101}{1010}$
40. 1953125.
41. 486 bu.
42. 4096 cu. ft.
43. $1250.
44. 625 lots.
45. 440 rails.
46. 375 lines.
47. 948 times.
48. 789.
49. 1064 sacks.
50. 186 cords.
51. 375 days.
52. 2808 bls.
53. $144.
54. 444.
55. 48750 lb.
56. 8315 sq. miles.
57. 569 miles.
58. 125 regim'ts.
59. 3125 cts.
60. 256 cu. ft.
61. 6859.
62. 160 days.
63. 2880 rails.
64. 480 lb.
65. 369 bu.
66. 9765625.
67. 10101 gal.
68. $45.
69. 2750 bricks.
70. 56 cts.
71. 450 boxes.
72. $475.
73. 256 acres.
74. 64 oysters.
75. 25 vol.

## ARTICLE 49.

1. $1.
2. 126336 cts.
3. 31625.
4. 189 acres.
5. 277401.
6. 500 cts.
7. 999 sheep.
8. 36 hrs.
9. 493.
10. 232 men.
11. 18 days.
12. 98.
13. 405.
14. $16.
15. 168 days.
16. 42 sacks.
17. 14400 miles.
18. $6692.
19. $18.
20. $19200.
21. 1728.
22. $5836.
23. 269 bls.
24. Nothing.
25. $7500
26. 666.
27. 462 rows.
28. 45 blocks.
29. 99456 bu.
30. 160 lemons.
31. $100000
32. 1887.
33. $48.
34. 55 logs.
35. $15625.
36. 135 cts.
37. Nothing.
38. $21312.
39. 22750 cts.
40. 63 boxes.
41. 50 acres.
42. $5250.
43. 45 gal.
44. 170.
45. $11625.
46. 15 men.
47. $13125.
48. 175 compan's.
49. 147199.
50. 150 loads.

## ARTICLE 53.

1. $25.37.
2. $56.75.
3. $32.918.
4. $10.01.
5. $143.67.
6. $900.009.
7. $781.056.
8. $500.05.
9. $895.99.
10. $1001.001.

## ARTICLE 55.

1. 7500 cts.
2. $15.
3. 990 mills.
4. 62 cts.5 mills.
5. 880 cts.
6. 50000 mills.
7. $18.375.
8. 8345 cts.
9. 321000 mills.
10. 100000 cts.
11. 100101 mills.
12. $86.40.
13. 75075 mills.
14. $100.
15. 1562500 cts.
16. $1562.50.
17. 50505 mills.
18. $100.001.
19. 90909 mills.
20. $1500.05.
21. 1000000 mills.

## ARTICLE 56.

1. $100.
2. $509.05.
3. $333.22.
4. $1000.
5. $1500.
6. $3333.33.
7. $1000.
8. $4500.45.
9. $6529.90.
10. $856.58.
11. $3970.94.
12. $4340.
13. $5000.
14. $2150.50.
15. $20000.

## ARTICLE 57.

1. $59.03.
2. $87.65.
3. $49.99.
4. $55.17.
5. $114.07.
6. $50.50.
7. $693.
8. $12.35.
9. $60.61.
10. $999.99.
11. $50.85.
12. $110.50.
13. $404.50.
14. $2579.20.
15. $200.
16. $297.42.
17. $100.
18. $247.50.
19. $50.
20. Son $1810.50, Daughter, $1500.75.

## ARTICLE 58.

1. $170.
2. $396.60.
3. $732.
4. $1825.25.
5. $2415.
6. $1000.
7. $1907.40.
8. $19702.50.
9. $28189.
10. $1000000.
11. $330.
12. $77.50.
13. $172.80.
14. $2700.
15. $218.75.
16. $577.50.
17. $343.75.
18. $4500.
19. $589.40.
20. $903.
21. $29568.
22. $10000.
23. $612.
24. $1375.
25. $54.
26. $36.
27. $450.
28. $337.50.
29. $2079.
30. $6300.
31. $405.
32. $337.50.
3. $60.
34. $2250.
35. $6000.
36. $75000.
37. $1452.
38. $3701.25.
39. $17600.
40. $36000.

## ARTICLE 59.

1. 175.
2. 392.
3. 416.
4. 4625.
5. 625.
6. 789.
7. 875.
8. 250.
9. 512.
10. 352.
11. $15.47.
12. $2.164.
13. $31.25.
14. $43.59.
15. $9.876.
16. $16.64.
17. $25.25.
18. $1.875.
19. $4.444.
20. $2.345.
21. 125 bu.
22. 160 lb.
23. 48 acres.
24. 1660 gal.
25. 80 turkeys.
26. 150 miles.
27. 729 cu. yds.
28. 13500 ft.
29. 16 cts. 5 mills.
30. $0.625.
31. $0.275.
32. $12.50.
33. $4.50.
34. $67.50.
35. $0.05.
36. 63 gal.
37. 84 cases.
38. 125 boxes.
39. $1.75.
40. 120 soldiers.

## ARTICLE 60.

1. $1500.
2. $989.45.
3. $2283.75.
4. 24 bls.
5. $218.75.
6. $1.50.
7. $161.95.
8. $1.75.
9. $14850.
10. $100.
11. 48 gal.
12. 175 bls.
13. 72 bu.
14. 125 bls.
15. 196 sheep.
16. Nothing.
17. 3760 lb.
18. $65.
19. $75.
20. $200.
21. $3250.
22. 1250 loads.
23. 80 bu.
24. $231.
25. 312 days.
26. 45 gal.
27. $118.80.
28. 64.
29. 128 acres.
30. 140 gal.
31. $1433.25.
32. $864.
33. 240 lb.
34. $11340.
35. 20 boxes.
36. $68.75.
37. 17 bls.
38. $83.75.
39. 40 sheep.
40. 16 acres.
41. 50 cts.
42. 100.
43. $1.125.
44. $1000.
45. $16.50.
46. C $24, D $19.20.
47. $225.
48. $5.25.
49. Nothing.
50. 99 days.
51. $9600.

## ARTICLE 63.

1. 373 pts.
2. 657 pts.
3. 1614 pts.
4. 3201 pts.
5. 2423 qts.
6. 63999 pts.
7. 3125 bu.
8. 625 pks.
9. 4 bu. 3 pks. 2 qts. 1 pt.
10. 1962 bu. 3 pk. 4 qts. 1 pt.
11. 1996 bu. 3 pk. 3 qts. 1 pt.
12. 114 bu. 1 pk. 5 qt.
13. $48.
14. $6.78.
15. $52.20.
16. 4 bu. 4 qts.
17. 160 boxes.
18. 99 bu.
19. $200.
20. 75 bu.

## ARTICLE 64.

1. 1085 gills.
2. 1619 gills.
3. 601 pts.
4. 3199 gills.
5. 2002 pts.
6. 100 gal.
7. 111 gal. 1 qt. 1 pt. 1 gill.
8. 1249 gal. 3 qts. 1 pt.
9. 312 gal. 2 qts. 1 gill.
10. 25 hhds. 3 gal. 1 pt.
11. 75600 gills.
12. $54.
13. $48.
14. $20.
15. $16.
16. $360.
17. $47.50.
18. 25 gal.
19. $1.25.
20. $43.20.

## ARTICLE 65.

1. 5999 lb.
2. 336170 oz.
3. 15993 oz.
4. 80050 lb.
5. 480255 oz.
6. 62 tons 16 cwt. 25 lb.
7. 19 cwt. 99 lb. 15 oz.
8. 50 tons 10 cwt. 10 lb.
9. 31 tons 11 cwt. 25 lb. 1 oz.
10. 11 tons 11 cwt. 11 lb. 11 oz.
11. $19.
12. $750.
13. 20 loads
14. $9000.
15. $1000.
16. 16 tons.
17. 6 tons 5 cwt
18. 95 tons 80 lb.
19. 1 ton.
20. $3375.

## ARTICLE 66.

1. 40125 rods.
2. 36034 in.
3. 63360 in.
4. 10000 rods.
5. 55555 in.
6. 1575 yds.
7. 75 miles 111 rods.
8. 1759 yds. 2 ft. 11 in.
9. 50 miles.
10. 15 miles.
11. 25 min.
12. $2640.
13. $4400.
14. $24000.
15. $47520.
16. 48 sec.
17. 2 miles.
18. 3 yds.
19. 125 miles.
20. 2500 miles.

## ARTICLE 67.

1. 12075 sq. rods.
2. 39204 sq. in.
3. 550055 sq. rods.
4. 1152088 sq. in.
5. 653400 sq. ft.
6. 625 acres.
7. 29 sq. yds. 41 sq. in.
8. 10 sq. miles 100 acres 100 sq. rods.
9. 25 acres.
10. 1 sq. mile 160 acres.
11. 60 sq. yds.
12. 2 acres.
13. $35.20.
14. $675.
15. $8.64.
16. $135.
17. $460.80.
18. $480.
19. 64 rods.
20. 36 ft.

## ARTICLES 68 AND 69.

1. 28 sq. yds.
2. $42.
3. $19.80.
4. $61.75.
5. $146.30.
6. $200.25.
7. $1000.
8. $2970.
9. 128 rods.
10. 50 rods, $186.20.
11. $209.10.
12. $34.65.
13. 2400 sheets.
14. $100.10.
15. $330.
16. 396000 blocks.
17. 2880 sods.
18. 208 tiles.
19. 600 bricks.
20. 96 panes.
21. $180.
22. 200 boards.
23. $3.60.
24. $1344.
25. $259.20.
26. $158400.

## ARTICLE 70.

1. 12900 cu. ft.
2. 444444 cu. in.
3. 500000 cu. in.
4. 356 cu. yds.
5. 1192820 cu. in.
6. 25 cu. yds.
7. 83 cords 1 cu. ft.
8. 9 cu. yds. 9 ft. 999 cu. in.
9. 32 cords.
10. 12 cords 64 cu. ft.
11. 154 cu. yds.
12. $18.75.
13. 150 cords.
14. 75 bars
15. 36 headst.
16. $750.
17. 96 boards.
18. 216 blocks.
19. 1152 gal.
20. 144 bu.
21. 36 cords.
22. 280 cu. yds.
23. 1296 blocks.
24. 144 posts.
25. $233.75.
26. $33.60.
27. $1512.
28. $360.
29. 13824 gal.
30. 80 planks.
31. 24 doz.
32. 945 boxes.
33. $6480.
34. 7 weeks.

## ARTICLE 71.

1. 20159 min.
2. 486605 sec.
3. 31622400 sec.
4. 525600 min.
5. 7776000 sec.
6. 1 week 1 hr. 1 sec.
7. 3 yrs.
8. 52 weeks 23 hrs. 59 min. 59 sec.
9. 4 leap years.
10. 365 days 5 hrs. 48 min. 46 sec.
11. 5 days 5 hrs.
12. $549.50.
13. 100 miles.
14. 1 week.
15. 5 days.
16. 12 acres.
17. 50 days.
18. 4 days.
19. 1620 bu.
20. 66 da. 6 hrs. 40 min.

## ARTICLE 73.

### Troy Weight.

1. 62119 gr.
2. 24200 pwt.
3. 575999 gr.
4. 75075 pwt.
5. 1000000 gr.
6. 99 lb.
7. 101 lb. 10 oz. 1 pwt.
8. 11 oz. 19 pwt. 23 gr.
9. 88 lb. 8 pwt.
10. 130 lb. 4 oz. 1 pwt. 6 gr.

11. $480.
12. 5 oz.
13. 25 lb.
14. $19200.
15. 4800 medals.
16. 100 cases.
17. 6 lb. 3 oz.
18. $180.
19. 15 lb. 10 oz. 10 pwt.
20. 600 bars.

## ARTICLE 73.

### Apothecaries' Weight.

1. 22375 gr.
2. 1461 ℈.
3. 50180 gr.
4. 3600 ℈.
5. 1234567 gr.
6. 11 ℥ 7 ℥ 2 ℈ 19 gr.
7. 100 lb.
8. 111 lb. 11 ℥ 1 ℥ 1 ℈ 1 gr.
9. 1000 ℥.
10. 99 lb. 11 ℥ 7 ℥ 2 ℈ 19 gr.
11. $5.35.
12. $5.77.
13. 1 lb. 3 ℥ 5 ℥.
14. $100.
15. 1 lb.
16. $10000.
17. 10000000 pellets.
18. 10 ℥ 3 ℥ 1 ℈.
19. 5 gr.
20. $31.

## ARTICLE 73.

### Miscellaneous Tables

1. $15.
2. 125 bls.
3. $3.75.
4. $0.05.
5. 100 bls.
6. $388.80.
7. $1.25.
8. $1520.
9. $187.50.
10. 25 bls.
11. $12500.
12. $270.
13. 625 reams.
14. $48.
15. $144.

## ARTICLE 74.

1. 1648 pts.
2. 3024 gills.
3. 320160 oz.
4. 35999 in.
5. 1000000 sq. rds.
6. 1111111 cu. in.
7. 4834800 sec.
8. 192000 gr.
9. 68671 gr.
10. 10101 sheets.
11. 291 bu. 1 pt.
12. 111 gal. 1 qt. 1 pt. 1 gi.

13. 4 tons 13 cwt. 75 lb.
14. 1759 yds. 2 ft. 11 in.
15. 99 sq. yds.
16. 10 cu. yds. 10 cu. ft. 10 cu. in.
17. 25 cords.
18. 1 wk. 1 day 1 hr. 1 min. 1 sec.
19. 77 lb. 1 oz. 18 pwt. 12 gr.
20. 5 lb. 4 ℥ 3 3 ʒ 2 ℈ 1 gr.
21. 125 reams.
22. 100 bls.
23. 64001 pts.
24. 31588 gills.
25. 671999 oz.
26. 32100 rods.
27. 625625 sq. rods.
28. 1000000 cu. in.
29. 31556926 sec.
30. 576241 gr.
31. 432425 gr.
32. 47999 sheets.
33. 550000 oz.
34. 15781 bu. 1 pk. 1 pt.
35. 489 hhds. 57 gal. 1 pt. 2 gills.
36. 156 tons 5 cwt.
37. 1500 yds. 2 ft. 6 in.
38. 99 sq. miles.
39. 10 cords 127 cu.ft. 1727 cu. in.
40. 26 wks. 14 hrs. 54 min.
41. 135 lb. 7 pwt. 9 gr.
42. 111 lb.
43. 916 reams 15 quires 4 sheets
44. 318 bls. 172 lb.
45. 15 sq. miles 501 acres 1 sq. rod.
46. 1515 cu. yds.
47. 1000000 gills.
48. 303849 oz.
49. 450 gross.
50. 50 miles.
51. $16.
52. $32.
53. $30.
54. $36.
55. $900.
56. $233.28.
57. $86.40.
58. $48.
59. $34.56.
60. $294.
61. $240.
62. $45.
63. $1200.
64. $9600.
65. $2880.
66. $720.
67. 420 doz.
68. 810 cards.
69. $2505.60.
70. 1296 cubes.
71. 8000 yds.
72. $50.
73. 50 doz.

74. $10.
75. $22.40.
76. 15 lb.
77. 10 hrs.
78. 20 T.
79. $6.
80. 64 farms.
81. $480.
82. $210.
83. 16 tons.
84. 2 hrs. 13 min. 20 sec.
85. $375.
86. 12096 bricks.
87. $24.30.
88. 24 sec.
89. $0.025.
90. $10540.80.
91. 96 sq. yds.
92. 5 tons.
93. 1 lb. 4 ʒ.
94. 5808 tons.
95. 19800 rev.
96. 45 doz.
97. $2664.
98. 2 cords.
99. $25.
100. $5760.
101. $5.50.
102. 8 ℥ 4 ʒ 2 ℈
103. 5 bls.
104. 30 days.
105. 6750 gal.
106. 15 bu.
107. 120 baskets.
108. 99 miles.
109. 40 bu.
110. 500 boxes.
111. 1 ton.
112. 40 min.
113. $150.
114. 144 lb.
115. 2 days 5 hrs. 20 min
116. $50.
117. 880 rev.
118. $3.60.
119. $99.
120. 4 cts.
121. 50 sheets.
122. 60 gal.
123. 10 oz.
124. 6 boxes.
125. 65 bls.

## Article 75.

1. 1000 bu.
2. 25 gal. 1 qt. 1 pt. 1 gi.
3. 7 T. 15 cwt. 75 lb.
4. 500 cu. yds.
5. 200 A. 40 sq. rds. 30 sq. yds.
6. 88 C. 88 cu. ft. 888 cu. in.
7. 30 wks. 6 da. 18 hrs. 40 min. 50 sec.
8. 10 lb.
9. 55 lb.
10. 100 mi.
11. 200 bu.
12. 313 gal. 1 qt. 1 pt. 1 gi.
13. 16 T. 99 lb.
14. 333 cu. yds. 25 cu. ft.
15. 639 A. 159 sq. rds. 30 sq. yds.
16. 1000 C.
17. 365 da. 5 hrs. 48 min. 46 sec., or 1 yr.
18. 18 lb. 1 oz. 2 pwt. 3 gr.
19. 100 lb. 10 ʒ.
20. 1000 mi.

## Article 76.

1. 49 bu. 7 qts. 1 pt
2. 11 bu. 1 pk. 1 pt.
3. 25 gal. 3 qts. 1 pt. 3 gi.
4. 100 gal. 1 qt. 1 gi.
5. 4 T. 3 cwt. 92 lb. 1 oz.
6. 50 A. 126 sq. rds. 15 sq. yds. 2 sq. ft. 40 sq. in.
7. 101 A. 99 sq. rds. 3 sq. yds. 6 sq. ft. 100 sq. in.
8. 39 mi. 270 rds. 4 yds. 1 ft. 7 in.
9. 150 mi. 170 rds. 4 yds.
10. 5 cu. yds. 25 cu. ft. 50 cu. in.
11. 99 cu. yds. 9 cu. ft. 999 cu. in.
12. 43 C. 127 cu. ft. 1272 cu. in.
13. 10 C. 100 cu. ft. 1000 cu. in.
14. 2 wks. 6 da. 58 min. 35 sec.
15. 200 da. 20 hrs. 20 min. 20 sec.
16. 12 lb. 11 oz. 15 gr.
17. 1 lb. 6 oz. 1 pwt. 17 gr.
18. 3 lb. 18 pwt. 21 gr.
19. 11 ℥ 6 ʒ 2 ℈ 1 gr.
20. 1 ℥ 10 gr.
21. 48 bu. 3 qts.
22. 150 gal. 3 qts. 1 gi.
23. 1 T. 7 cwt. 96 lb.
24. 33 mi. 175 rds. 2 ft.
25. 160 A. 25 sq. yds.
26. 26 cu. yds. 25 cu. ft. 1025 cu. in.
27. 27 C. 14 cu. ft.
28. 2 wks. 2 da. 19 hrs. 48 sec.
29. 1 lb. 1 ℥ 1 ʒ 1 ℈ 1 gr.
30. 17 oz. 5 pwt. 4 gr.

## Article 77.

1. 1 yr. 4 mo. 1 da.
2. 10 yrs. 7 mo. 14 da.
3. 6 yrs. 6 mo.
4. 399 yrs. 2 mo. 19 da.
5. 2 yrs. 7 mo. 29 da.
6. 84 yrs. 3 mo.
7. 2 yrs. 4 mo. 22 da.
8. 37 yrs. 6 mo. 12 da.
9. 45 yrs. 10 mo. 3 da.
10. 3 yrs. 26 da.
11. 19 yrs. 28 da.
12. Sister, July 10, 1883. Brother, Oct. 17, 1880.

## ARTICLE 78.

1. 100 da.
2. 139 da.
3. 150 da.
4. 111 da.
5. 132 da.
6. 99 da.
7. 70 da.
8. 175 da.
9. 158 da.
10. 100 da.
11. 151 da.
12. $320.
13. May 9, 1892.

## ARTICLE 79.

1. 72 bu. 1 pk. 5 qts. 1 pt.
2. 250 gal.
3. 30 T. 5 cwt. 15 lb.
4. 150 rds.
5. 29 sq. yds. 8 sq. ft. 24 sq. in.
6. 99 C. 50 cu. ft.
7. 51 wks. 6 da. 12 hrs. 50 min. 30 sec.
8. 1000 lb.
9. 382 lb. 10 ℥ 3 ℨ 2 ℈ 10 gr.
10. 1750 cu. yds.
11. 1375 bu.
12. 3164 gal. 3 qts. 1 pt. 1 gi.
13. 45 T.
14. 10051 mi.
15. 375 C. 75 cu. ft.
16. 51 wks. 5 da. 6 hrs. 52 min. 30 sec.
17. 5 lb.
18. 175 lb.
19. 134 cu. yds. 17 cu. ft. 720 cu. in.
20. 160 A.

## ARTICLE 80.

1. 8 bu. 2 pks. 5 qts. 1 pt.
2. 9 gal. 3 qts. 1 pt. 3 gi.
3. 5 T. 5 cwt. 5 lb. 5 oz.
4. 15 yds. 2 ft. 10 in.
5. 30 sq. yds. 2 sq. ft. 36 sq. in.
6. 2 wks. 1 da. 4 hrs. 20 min. 12 sec.
7. 5 C. 50 cu. ft. 50 cu. in.
8. 15 lb. 7 oz. 10 pwt.
9. 13 lb. 10 ℥ 5 ℨ 1 ℈
10. 25 cu. yds. 15 cu. ft. 480 cu. in.
11. 50 bu. 1 pk. 4 qts. 1 pt.
12. 31 gal. 2 qts. 2 gi.
13. 15 yds. 2 ft. 6 in.

14. 30 sq. yds. 5 sq. ft. 96 sq. in.
15. 1 C. 6 cu. ft. 64 cu. in.
16. 3 da. 23 hrs. 2 min. 24 sec.
17. 4 lb. 8 oz. 10 pwt.
18. 1 T. 11 cwt. 25 lb.
19. 1 cu. yd. 5 cu. ft. 108 cu. in.
20. 1 A. 12 sq. rds. 22 sq. yds.
21. 1 wk. 2 da. 3 hrs. 4 min. 5 sec.

## Articles 81 and 82.

1. 3 hrs. 20 min.
2. 1 hr. 34 min.
3. 2 hrs. 30 min. 28 sec.
4. 3 hrs. 4 sec.
5. 5 hrs. 8 min. 41 sec.
6. 6 hrs. 3 min. 59 sec.
7. 6 hrs. 42 min.
8. 4 hrs. 36 min. 38 sec.
9. 7 hrs. 52 min. 21 sec.
10. 11 hrs. 59 min. 59 sec.
11. 21°
12. 32° 30′
13. 52° 55′
14. 60° 51′ 15″
15. 80° 19′ 30″
16. 108° 24′ 45″
17. 130° 28′ 15″
18. 139° 48′
19. 168° 3′ 30″
20. 13° 58′ 45″
21. 2 hrs. 56 min.
22. 9 hrs. 33 min. a. m.
23. 2 hrs. 51 min. 48 sec.
24. 15 min. 20 sec.
25. 2 hrs. 13 min. 5 sec.
26. 5 hrs. 1 min. 29 sec. p. m.
27. 7 hrs. 4 min. 20 sec. a. m.
28. 53 min. past 7 p. m.
29. 5 o'clock p. m.
30. 11 hrs. 33 min. or 27 min.

## Article 87.

1. 2, 2, 2, 7.
2. 2, 2, 2, 2, 2, 2.
3. 2, 2, 3, 7.
4. 2, 2, 5, 5.
5. 2, 2, 2, 2, 3, 3.
6. 3, 3, 5, 5.
7. 2, 2, 3, 5, 7.
8. 2, 3, 7, 13.
9. 2, 3, 5, 19.
10. 2, 5, 7, 11.
11. 2, 2, 2, 2, 2, 3, 3, 3.
12. 7, 11, 13.
13. 7, 11, 17.
14. 7, 13, 19.
15. 5, 17, 23.
16. 7, 11, 31.
17. 11, 13, 17.
18. 7, 19, 23.
19. 2, 3, 19, 29.
20. 2, 3, 5, 7, 17.
21. 3, 13, 103.

## ARTICLE 88.

1. 3, 5.
2. 2, 2, 2, 3.
3. 2, 3, 7.
4. 3, 3, 3.
5. 3, 5, 7.
6. 2, 7, 11.
7. 3, 23.
8. 7, 19.
9. 3, 3, 13.
10. 3, 5, 11.
11. 3, 7, 13.
12. 2, 3, 3.
13. 2, 3, 7.
14. 2, 2, 7.
15. 2, 11.
16. 2, 5, 7.
17. 2, 3, 11.
18. 3, 13.
19. 7, 23.
20. 2, 2, 17.
21. 2, 3, 19.
22. 3, 7, 13

## ARTICLE 89.

1. 19.
2. 24.
3. 31.
4. 27.
5. 29.
6. 36.
7. 39.
8. 43.
9. 53.
10. 64.
11. 154.
12. 172.
13. 185.
14. 201.
15. 333.
16. 399.
17. 1.
18. 432.
19. 143.
20. 555.
21. 19.
22. 24.
23. 37.
24. 56.
25. 51.
26. 11.
27. 39.
28. 3.
29. 23.
30. 27.
31. 31 gal.
32. 29 ft.
33. 83 bins, 99 bu.
34. 6 doz.
35. $73000.

## ARTICLE 90.

1. 84.
2. 90.
3. 120.
4. 126
5. 220.
6. 270.
7. 312.
8. 480.
9. 150.
10. 210.
11. 450.
12. 510.
13. 600.
14. 180.
15. 420.
16. 360.
17. 420.
18. 540.
19. 546.
20. 660.
21. 720.

22. 1190.
23. 1330.
24. 1610.
25. 1785.
26. 3003.
27. 3230.
28. 5865.
29. 6699.
30. 5005.
31. 11557.
32. 10185.
33. 630 ft.
34. 600 lb.
35. $300.
36. 3 hrs.
37. 9690 bu.

## ARTICLE 91.

1. 12.
2. 42.
3. 66.
4. 3.
5. 1.
6. 15 bu.
7. 27 cts.
8. 240 lb.
9. 2160 sods.
10. $472.50.
11. $26.
12. $10.
13. $22.50.
14. 36 men.
15. 8 hrs.
16. 24 days.
17. 9 cts.
18. $20.16.
19. 54 thousand.
20. 2592 tiles.
21. 180 doz.

## ARTICLE 103.

1. $\frac{169}{13}$
2. $\frac{187}{17}$
3. $\frac{875}{35}$
4. $\frac{380}{20}$
5. $\frac{1452}{44}$
6. $\frac{1073}{37}$
7. $\frac{2303}{49}$
8. $\frac{1064}{19}$
9. $\frac{1600}{25}$
10. $\frac{4200}{56}$
11. $\frac{1875}{15}$
12. $\frac{4800}{50}$
13. $\frac{2160}{48}$
14. $\frac{2484}{36}$
15. $\frac{1540}{28}$
16. $\frac{936}{24}$
17. $\frac{1728}{64}$
18. $\frac{6600}{75}$
19. $\frac{9801}{99}$
20. $\frac{10100}{100}$

## ARTICLE 104.

1. $\frac{276}{11}$
2. $\frac{472}{15}$
3. $\frac{1234}{25}$
4. $\frac{2136}{37}$
5. $\frac{2969}{45}$
6. $\frac{4645}{59}$
7. $\frac{5503}{66}$
8. $\frac{9900}{99}$
9. $\frac{10099}{100}$
10. $\frac{12332}{111}$
11. $\frac{12678}{101}$
12. $\frac{30994}{125}$
13. $\frac{110922}{333}$
14. $\frac{16999}{401}$
15. $\frac{26937}{463}$
16. $\frac{34220}{509}$
17. $\frac{47047}{625}$
18. $\frac{67576}{777}$
19. $\frac{81439}{859}$
20. $\frac{99999}{1000}$
21. $\frac{101111}{1001}$
22. $\frac{110900}{999}$
23. $\frac{83809}{289}$
24. $\frac{166661}{444}$
25. $\frac{166661}{375}$
26. $\frac{65807}{144}$
27. $\frac{229229}{555}$
28. $\frac{53000}{1331}$
29. $\frac{122222}{1515}$
30. $\frac{151950}{2001}$

## ARTICLE 105.

1. $12\frac{10}{13}$
2. $29\frac{11}{19}$
3. $37\frac{20}{23}$
4. $43\frac{32}{87}$
5. 49.
6. $56\frac{21}{44}$
7. $68\frac{16}{59}$
8. $75\frac{15}{68}$
9. $84\frac{32}{75}$
10. 88.
11. $96\frac{53}{81}$
12. $101\frac{1}{99}$
13. $111\frac{11}{100}$
14. $129\frac{117}{125}$
15. 137.
16. $150\frac{91}{144}$
17. $117\frac{13}{25}$
18. $49\frac{151}{201}$
19. $57\frac{59}{225}$
20. 63.
21. $72\frac{89}{303}$
22. $87\frac{374}{375}$
23. $98\frac{114}{407}$
24. $110\frac{110}{449}$
25. 125.
26. $139\frac{261}{644}$
27. $140\frac{319}{712}$
28. $156\frac{5}{864}$
29. $160\frac{48}{925}$
30. 175

## ARTICLE 106.

1. $\frac{30}{35}$
2. $\frac{28}{52}$
3. $\frac{54}{69}$
4. $\frac{96}{99}$
5. $\frac{64}{100}$
6. $\frac{99}{135}$
7. $\frac{68}{144}$
8. $\frac{95}{225}$
9. $\frac{138}{288}$
10. $\frac{104}{456}$
11. $\frac{165}{704}$
12. $\frac{481}{936}$
13. $\frac{840}{1305}$
14. $\frac{187}{1547}$
15. $\frac{1691}{1881}$
16. $\frac{2121}{2163}$
17. $\frac{925}{2800}$
18. $\frac{2178}{3927}$
19. $\frac{2912}{4000}$
20. $\frac{1500}{1728}$
21. $\frac{611}{1950}$
22. $\frac{2375}{5400}$
23. $\frac{1247}{6293}$
24. $\frac{4785}{8448}$
25. $\frac{9746}{9768}$

## ARTICLE 107.

1. $\frac{8}{13}$
2. $\frac{8}{21}$
3. $\frac{10}{27}$
4. $\frac{5}{8}$
5. $\frac{32}{68}$
6. $\frac{26}{68}$
7. $\frac{11}{15}$
8. $\frac{26}{46}$
9. $\frac{25}{37}$
10. $\frac{15}{22}$
11. $\frac{38}{111}$
12. $\frac{28}{55}$
13. $\frac{28}{33}$
14. $\frac{18}{35}$
15. $\frac{14}{27}$
16. $\frac{32}{85}$
17. $\frac{60}{91}$
18. $\frac{15}{28}$
19. $\frac{17}{22}$
20. $\frac{143}{280}$
21. $\frac{161}{174}$
22. $\frac{39}{55}$
23. $\frac{53}{68}$
24. $\frac{9}{11}$
25. $\frac{91}{99}$
26. $\frac{81}{119}$
27. $\frac{51}{76}$
28. $\frac{345}{418}$
29. $\frac{9}{13}$
30. $\frac{38661}{51168}$

## ARTICLE 108.

1. $\frac{16}{24}, \frac{15}{24}, \frac{14}{24}$
2. $\frac{32}{36}, \frac{33}{36}, \frac{34}{36}$
3. $\frac{16}{40}, \frac{15}{40}, \frac{36}{40}$
4. $\frac{42}{60}, \frac{35}{60}, \frac{28}{60}, \frac{21}{60}$
5. $\frac{30}{72}, \frac{28}{72}, \frac{33}{72}, \frac{34}{72}$
6. $\frac{48}{84}, \frac{49}{84}, \frac{54}{84}, \frac{64}{84}$
7. $\frac{64}{120}, \frac{65}{120}, \frac{68}{120}, \frac{69}{120}$
8. $\frac{60}{105}, \frac{56}{105}, \frac{55}{105}, \frac{54}{105}$
9. $\frac{45}{126}, \frac{49}{126}, \frac{48}{126}, \frac{51}{126}$
10. $\frac{99}{144}, \frac{78}{144}, \frac{76}{144}, \frac{75}{144}$
11. $\frac{70}{140}, \frac{105}{140}, \frac{112}{140}, \frac{120}{140}$
12. $\frac{40}{150}, \frac{96}{150}, \frac{85}{150}, \frac{69}{150}, \frac{74}{150}$
13. $\frac{84}{180}, \frac{70}{180}, \frac{63}{180}, \frac{35}{180}, \frac{28}{180}$
14. $\frac{63}{210}, \frac{75}{210}, \frac{56}{210}, \frac{80}{210}, \frac{78}{210}$
15. $\frac{275}{330}, \frac{99}{330}, \frac{120}{330}, \frac{176}{330}, \frac{162}{330}$
16. $\frac{130}{364}, \frac{126}{364}, \frac{169}{364}, \frac{175}{364}, \frac{176}{364}$
17. $\frac{105}{390}, \frac{143}{390}, \frac{140}{390}, \frac{114}{390}, \frac{245}{390}$
18. $\frac{325}{450}, \frac{288}{450}, \frac{285}{450}, \frac{280}{450}, \frac{384}{450}$
19. $\frac{363}{462}, \frac{286}{462}, \frac{315}{462}, \frac{253}{462}, \frac{246}{462}$
20. $\frac{147}{315}, \frac{120}{315}, \frac{81}{315}, \frac{77}{315}, \frac{85}{315}$
21. $\frac{425}{510}, \frac{153}{510}, \frac{68}{510}, \frac{105}{510}, \frac{72}{510}$
22. $\frac{330}{540}, \frac{189}{540}, \frac{260}{540}, \frac{306}{540}, \frac{228}{540}$
23. $\frac{135}{630}, \frac{168}{630}, \frac{175}{630}, \frac{300}{630}, \frac{216}{630}$
24. $\frac{208}{546}, \frac{231}{546}, \frac{224}{546}, \frac{247}{546}, \frac{222}{546}$
25. $\frac{285}{684}, \frac{266}{684}, \frac{156}{684}, \frac{261}{684}, \frac{318}{684}$
26. $\frac{442}{714}, \frac{399}{714}, \frac{391}{714}, \frac{392}{714}, \frac{396}{714}$
27. $\frac{455}{780}, \frac{416}{780}, \frac{429}{780}, \frac{400}{780}, \frac{396}{780}$
28. $\frac{728}{840}, \frac{640}{840}, \frac{665}{840}, \frac{567}{840}, \frac{615}{840}$
29. $\frac{715}{858}, \frac{273}{858}, \frac{297}{858}, \frac{308}{858}, \frac{450}{858}$
30. $\frac{161}{966}, \frac{621}{966}, \frac{598}{966}, \frac{574}{966}, \frac{522}{966}$
31. $\frac{325}{819}, \frac{432}{819}, \frac{448}{819}$
32. $\frac{289}{952}, \frac{376}{952}, \frac{553}{952}$
33. $\frac{437}{828}, \frac{513}{828}, \frac{404}{828}$
34. $\frac{348}{1015}, \frac{168}{1015}, \frac{180}{1015}$
35. $\frac{637}{1287}, \frac{638}{1287}, \frac{639}{1287}$
36. $\frac{403}{1302}, \frac{224}{1302}, \frac{288}{1302}$
37. $\frac{925}{2331}, \frac{675}{2331}, \frac{875}{2331}$
38. $\frac{2540}{4380}, \frac{2355}{4380}, \frac{2244}{4380}$
39. $\frac{1188}{3612}, \frac{1211}{3612}$
40. $\frac{4301}{6409}, \frac{4303}{6409}$

### Greatest Common Divisor of Fractions.

1. $\frac{5}{48}$
2. $\frac{4}{185}$
3. $\frac{11}{72}$
4. $\frac{16}{45}$
5. $\frac{1}{60}$
6. $\frac{15}{64}$
7. $\frac{25}{36}$
8. $\frac{37}{150}$
9. $\frac{13}{185}$
10. $\frac{25}{48}$
11. $\frac{17}{168}$
12. $1\frac{31}{144}$

### Least Common Multiple of Fractions.

1. 12.
2. $13\frac{1}{8}$
3. 60.
4. $187\frac{1}{5}$
5. $17\frac{1}{15}$
6. 72.
7. $101\frac{1}{4}$
8. 300.
9. $68\frac{1}{18}$
10. $444\frac{8}{9}$
11. $248\frac{4}{7}$
12. $1046\frac{10}{18}$

## ARTICLE 111.

1. $4\frac{2}{15}$
2. $3\frac{5}{16}$
3. 3.
4. $1\frac{1}{2}$
5. 6.
6. $4\frac{5}{6}$
7. $3\frac{3}{8}$
8. $6\frac{2}{3}$
9. $2\frac{7}{18}$
10. $53\frac{11}{12}$
11. $8\frac{1}{6}$
12. $\frac{49}{50}$
13. 1.
14. 22.
15. $15\frac{2}{7}$
16. $101\frac{37}{120}$
17. $21\frac{1}{2}$
18. $31\frac{3}{4}$
19. 50.
20. 100.
21. 1000.
22. $25\frac{29}{80}$
23. $\$220\frac{7}{20}$
24. $139\frac{39}{64}$ bu.
25. $\$315\frac{1}{2}$
26. $300.
27. 60 A.
28. 50 mi.
29. 320 rds.
30. $10\frac{4}{5}$ T.
31. 200 gal.
32. $73\frac{1}{3}$ da.
33. $2158\frac{31}{120}$ bu. / $\$1883\frac{49}{80}$
34. $90\frac{1}{4}$ oz.

## ARTICLE 114.

1. $\frac{7}{24}$
2. $\frac{5}{36}$
3. $\frac{1}{48}$
4. $\frac{8}{45}$
5. $\frac{3}{50}$
6. $\frac{1}{300}$
7. $\frac{11}{800}$
8. $\frac{9}{400}$
9. $\frac{13}{96}$
10. $\frac{21}{1300}$
11. $2\frac{17}{72}$
12. $4\frac{19}{100}$
13. $10\frac{139}{144}$
14. $24\frac{133}{150}$
15. $99\frac{71}{110}$
16. $111\frac{157}{192}$
17. $164\frac{185}{216}$
18. $444\frac{221}{225}$
19. $300\frac{142}{195}$
20. $999\frac{999}{1000}$
21. $\frac{1}{3663}$
22. 100.
23. $25\frac{4}{5}$
24. $6\frac{2}{8}$
25. $\frac{1}{63}$
26. $95\frac{7}{195}$
27. $3\frac{13}{80}$ da.
28. $199\frac{119}{120}$ bu.
29. $3\frac{33}{40}$
30. $25\frac{255}{488}$
31. $25.
32. $6\frac{4}{45}$ da.
33. $99\frac{9}{10}$ lb.
34. $\$\frac{1}{10}$
35. 150 A.
36. $66\frac{2}{3}$ da.
37. 400 rds.
38. $\$99\frac{99}{100}$

## ARTICLE 115.

1. $\frac{2}{15}$
2. $\frac{5}{33}$
3. $\frac{9}{25}$
4. $\frac{1}{14}$
5. $\frac{2}{9}$
6. $\frac{1}{49}$
7. 1.
8. 14.
9. 10.
10. 100.
11. 1200.
12. $1066\frac{2}{3}$
13. $2\frac{1}{2}$
14. $\frac{1024}{10395}$
15. 1000.
16. $44\frac{4}{9}$
17. $\frac{16}{25}$
18. $2\frac{5}{8}$
19. 15.
20. 2500.
21. 1.

## ARTICLE 118.

1. 30 cts.
2. $8.80.
3. $13.12\frac{1}{2}$
4. 93 cts.
5. $65.
6. $39\frac{3}{5}$
7. $740.
8. $233\frac{1}{10}$
9. $45.50.
10. $114\frac{9}{50}$
11. $453\frac{24}{25}$
12. $100.
13. $74\frac{1}{10}$
14. $14.24\frac{1}{2}$
15. $1000.
16. $10.
17. $35.87\frac{1}{2}$
18. $25\frac{7}{20}$
19. $4.42\frac{1}{2}$
20. $25\frac{1}{2}$
21. $113\frac{3}{4}$
22. 90.
23. $380\frac{1}{10}$
24. 336 mi.
25. $518\frac{3}{4}$ bl.
26. $89.06.
27. $450.
28. $80\frac{1}{2}$
29. $497\frac{1}{4}$
30. $13281\frac{1}{4}$
31. 975 mi.
32. $36\frac{2}{5}$
33. $35\frac{3}{20}$
34. $52\frac{1}{2}$
35. $200\frac{1}{40}$ A.

## ARTICLE 119.

1. $1\frac{1}{3}$
2. $\frac{16}{125}$
3. 20.
4. $\frac{14}{15}$
5. $4\frac{4}{5}$
6. $\frac{8}{39}$
7. $49\frac{1}{2}$
8. $\frac{51}{80}$
9. $30\frac{3}{8}$
10. $\frac{32}{33}$
11. 9.
12. $1\frac{1}{2}$
13. 1125.
14. $\frac{1}{440}$
15. $3\frac{1}{2}$
16. 1.
17. 10.
18. 100.
19. 1000.
20. 10000.
21. $\frac{1}{75}$
22. $15\frac{9}{10}$
23. 27 or.
24. $\frac{3}{5}$ bl.
25. 12 lb.
26. $13\frac{1}{3}$ mi.
27. $11\frac{1}{4}$ da.
28. $18\frac{3}{4}$ A.
29. $1\frac{2}{3}$
30. $1\frac{2}{25}$
31. $1\frac{7}{8}$ C.
32. $12\frac{4}{5}$ T.
33. $64\frac{4}{5}$
34. $26\frac{1}{2}$ yds.
35. $36\frac{1}{4}$ rds.
36. $24\frac{1}{5}$ A.
37. $41\frac{2}{3}$ bu.
38. $127\frac{2}{5}$ C.
39. 12 hrs.
40. 50 A.
41. $\frac{2}{8}$ of it.
42. 18 men.

## ARTICLE 120.

1. $\frac{5}{8}$
2. $\frac{8}{5}$
3. $\frac{4}{9}$
4. $\frac{4}{5}$
5. $\frac{15}{32}$
6. $\frac{8}{9}$
7. $\frac{9}{16}$
8. $\frac{16}{25}$
9. $\frac{32}{45}$
10. $\frac{25}{33}$
11. $\frac{490}{560}$
12. $\frac{688}{775}$
13. $\frac{155}{222}$
14. $\frac{1}{2}$
15. $\frac{15}{32}$
16. $\frac{1}{4}$
17. 1.
18. $\frac{8}{4}$
19. $\frac{13}{16}$
20. $\frac{96}{125}$

## ARTICLE 121.

1. $\frac{25}{36}$
2. $\frac{15}{16}$
3. $\frac{4}{9}$
4. $\frac{4}{15}$
5. $\frac{9}{11}$
6. $1\frac{3}{7}$
7. $4\frac{8}{15}$
8. $\frac{1}{20}$
9. $\frac{9}{80}$
10. $4\frac{1}{2}$
11. $1\frac{5}{27}$
12. $\frac{3}{7}$
13. $\frac{10}{11}$
14. $\frac{33}{40}$
15. $\frac{2}{3}$
16. $\frac{3}{4}$
17. 125.
18. $\frac{11}{105}$
19. $3\frac{3}{4}$
20. $7\frac{1}{2}$

## ARTICLE 122.

1. $\frac{32}{45}$
2. $6\frac{6}{25}$
3. $\frac{74}{75}$
4. $93\frac{1}{3}$
5. $\frac{8}{15}$
6. A $\frac{5}{8}$; B $\frac{3}{8}$
7. $9\frac{3}{8}$ yds.
8. $\$4\frac{4}{5}$
9. $12\frac{1}{2}$ T.
10. $50
11. 32 rings.
12. 100 sheep.
13. $\$4\frac{4}{5}$
14. $4.
15. 45 yds.
16. $\frac{16}{25}$
17. 20 boxes.
18. 75 gal.
19. A $\$10\frac{4}{5}$; B $\$9\frac{3}{5}$
20. $\frac{3}{4}$

## ARTICLE 124.

1. $\frac{7}{8}$ pt.
2. $\frac{3}{5}$ gi.
3. $\frac{16}{25}$ oz.
4. $\frac{1}{2}$ sq. yd.
5. $\frac{1}{4}$ yd.
6. $\frac{3}{8}$ cu. ft.
7. $\frac{14}{15}$ min.
8. $\frac{4}{5}$ gr.
9. $\frac{9}{10}$ gr.
10. $\frac{2}{3}$ oz.
11. $\frac{24}{25}$ qt.
12. $\frac{5}{32}$ pt.
13. $\frac{24}{25}$ oz.
14. $\frac{6}{8}\frac{9}{0}\frac{3}{0}$ sq. ft.
15. $\frac{5}{6}$ ft.
16. $\frac{3}{4}$ cu. in.
17. $\frac{9}{20}$ min.
18. $\frac{7}{15}$ gr.
19. $\frac{13}{16}$ gr.
20. $\frac{3}{4}$ gi.

## ARTICLE 125.

1. 1 pk. 1 qt. 1 pt.
2. 3 qts. 1 pt. 3 gi.
3. 2 cwt. 62 lb. 8 oz.
4. 65 sq. rds. 13 sq. yds. 6 sq. ft. 108 sq. in.
5. 161 rds. 3 yds. 1 ft. 2 in.
6. 78 cu. ft. 384 cu. in.
7. 4 da. 2 hrs. 26 min 15 sec.
8. 3 oz. 14 pwt. 6 gr.
9. 7 ℥ 4 ʒ 1 ℈ 10 gr.
10. 8 cwt. 32 lb. 8 oz.
11. 3 pks. 7 qts. $1\frac{1}{2}$ pts.
12. 1 qt. 1 pt. $3\frac{5}{8}$ gi.

13. 141 rds. 2 yds. 10 in.
14. 396 A. 111 sq. rds. 2 sq. yds. 2 sq. ft. 36 sq. in.
15. 112 cu. ft. 1024 cu. in.
16. 7 cu. ft. 1404 cu. in.
17. 1 da. 23 hrs. 47 min. 12 sec.
18. 4 oz. 13 pwt. 9 gr.
19. 4 ℥ 3 ʒ 2 ℈ 5 gr.
20. 34 gal. 2 qts. 1 pt. 3 gi.

## ARTICLE 126.

1. $\frac{1}{96}$ bu.
2. $\frac{1}{40}$ gal.
3. $\frac{1}{1650}$ cwt.
4. $\frac{1}{240}$ rod.
5. $\frac{1}{279}$ sq. rd.
6. $\frac{1}{51840}$ cu. yd.
7. $\frac{1}{15750}$ wk.
8. $\frac{1}{6912}$ lb.
9. $\frac{1}{6000}$ lb.
10. $\frac{1}{2112}$ hhd.
11. $\frac{3}{200}$ bu
12. $\frac{2}{75}$ gal.
13. $\frac{2}{4875}$ T.
14. $\frac{3}{16000}$ mi.
15. $\frac{3}{16000}$ A.
16. $\frac{11}{2000}$ C.
17. $\frac{1}{1500}$ da.
18. $\frac{4}{1875}$ lb.
19. $\frac{3}{880}$ lb.
20. $\frac{9}{5000}$ hhd.

## ARTICLE 127.

1. $\frac{45}{64}$ bu.
2. $\frac{15}{16}$ gal.
3. $\frac{115}{128}$ T.
4. $\frac{85}{99}$ rd.
5. $\frac{5}{9}$ A.
6. $\frac{9}{16}$ C.
7. $\frac{25}{64}$ da.
8. $\frac{44}{45}$ lb.
9. $\frac{63}{80}$ lb.
10. $\frac{25}{72}$ hhd.
11. $\frac{5}{8}$
12. $\frac{7}{10}$
13. $\frac{5}{9}$
14. $\frac{8}{11}$
15. $\frac{5}{6}$
16. $\frac{7}{12}$
17. $\frac{3}{4}$
18. $\frac{4}{7}$
19. $\frac{4}{5}$
20. $\frac{9}{11}$
21. $\frac{11}{45}$

## ARTICLE 128.

1. 3 pks. 3 qts.
2. 1 gal. 1 pt.
3. 6 cwt. 81 lb. 3 oz.
4. 87 rds. 5 yds. 4 in.
5. 121 sq. rds. 30 sq. yds. 126 sq. in.
6. 4 da. 2 hrs. 3 min. 45 sec.
7. 1 lb. 10 pwt. 15 grains.
8. 16 cu. ft.
9. 4 ℥ 5 3 2 ℈ 16 grains.
10. 1 bu.
11. 4 cwt. 42 lb. 3 oz.
12. 119 rds. 1 ft. 4 in.

13. 92 sq. rds. 3 sq. yds. 4 sq. ft. 54 sq. in.
14. 3 cu. ft. 486 cu. in.
15. 6 oz. 7 pwt. 5 gr.
16. 7 ℥ 5 ʒ 1 ℈ 16 gr.
17. 1 pk. 6 qts.
18. 23 gal. 1 qt. 1 gi.
19. 125 A. 16 sq. rds.
20. 28 da. 5 hrs. 2 min. 24 sec.

## Article 129.

1. $\frac{3}{5}$
2. 174 A. 87 sq. rds. 8 sq. yds. 2 sq. ft. 36 sq. in.
3. $\frac{2}{3}$
4. $172.
5. $315.
6. $\frac{3}{14}$
7. $6\frac{41}{48}$
8. $\frac{16}{45}$ wk.
9. $24\frac{2}{5}$
10. $18\frac{5}{8}$ bls.
11. $2720; $\frac{7}{82}$; $595.
12. $127.20.
13. $1\frac{1}{2}$
14. $1\frac{2}{3}$
15. $2000.
16. 1 hr.
17. $\frac{5}{8}$
18. $6\frac{3}{4}$ hrs.
19. $7\frac{1}{2}$ da.
20. 100.
21. $16\frac{2}{3}$
22. $248\frac{3}{5}$
23. $15750.
24. $\frac{7}{18}$ lb.
25. $76\frac{2}{3}$
26. $9\frac{3}{8}$ C.
27. 1560 sods.
28. 45 peach trees.
29. $7.92.
30. $1546\frac{4}{5}$
31. $22\frac{11}{12}$
32. $44\frac{4}{9}$
33. $53\frac{1}{3}$
34. 2090.
35. $302\frac{3}{4}$
36. $1020.
37. $1.33\frac{1}{3}$
38. 75 sheep.
39. Sum, $360; B's, $100.
40. 50 rds.
41. $8\frac{2}{5}$ hrs.
42. 12 horses.
43. 1.
44. 10 hrs.; A, $37\frac{1}{2}$ mi.; B, 44 mi.
45. $1000.
46. 225 bu.
47. $33\frac{1}{3}$ A.
48. $1000.
49. 5 T.
50. $\frac{1}{2}$

51. 1 A.
52. 54 rugs.
53. $115.50.
54. $\frac{1}{6}\frac{5}{4}$ da.
55. $1500.
56. 15 bls.
57. $448.
58. $103\frac{3}{5}$
59. $9\frac{9}{20}$
60. 58 da. 10 hrs. 33 min. 36 sec.
61. $343\frac{3}{4}$
62. $3\frac{21}{25}$
63. $453\frac{33}{50}$
64. 48 hogs.
65. $682\frac{1}{2}$
66. $37\frac{3}{4}$
67. $787\frac{1}{2}$
68. $116\frac{11}{20}$
69. $\$\frac{4}{5}$
70. $323\frac{1}{8}$ mi.
71. C, $5\frac{3}{5}$; D, $6\frac{3}{10}$
72. $126.
73. $60.60.
74. $62\frac{1}{2}$ A.
75. 4500 bu.
76. 560 revolutions.
77. $459\frac{1}{5}$ mi.
78. $3\frac{9}{10}$
79. $123\frac{3}{4}$
80. $142\frac{1}{2}$
81. $150
82. $123\frac{21}{50}$
83. $1\frac{1}{4}$ T.
84. B had $57\frac{1}{2}$
85. $32\frac{2}{5}$
86. $7\frac{1}{8}$ da.
87. $33.60.
88. $11\frac{1}{10}$ yds.
89. $2500.
90. $12\frac{1}{2}$ da.
91. $51\frac{3}{4}$
92. 150 A.
93. 160 A.
94. 25 mi.; 775 mi.
95. 275 mi.
96. A, $\frac{5}{24}$; B, $\frac{5}{16}$; C, $\frac{5}{48}$; D, $\frac{5}{24}$
97. $22\frac{1}{2}$
98. $3\frac{1}{9}$
99. C, $11\frac{1}{4}$; D, $9.
100. 100 bls.
101. $999.
102. $456\frac{11}{20}$

## Article 141.

1. $\frac{49}{50}$
2. $\frac{8}{25}$
3. $\frac{8}{125}$
4. $\frac{13}{40}$
5. $\frac{27}{40}$
6. $\frac{1}{125}$
7. $\frac{1}{80}$
8. $\frac{9}{16}$
9. $\frac{79}{80}$
10. $\frac{1}{400}$
11. $\frac{16}{625}$
12. $\frac{7}{800}$
13. $\frac{3}{160}$
14. $\frac{5}{32}$
15. $\frac{37}{160}$
16. $\frac{31}{32}$

17. $\frac{3}{820}$
18. $\frac{15}{64}$
19. $\frac{3}{8000}$
20. $\frac{5}{64}$
21. $1\frac{1}{5}$
22. $3\frac{3}{4}$
23. $5\frac{9}{20}$
24. $7\frac{5}{8}$
25. $9\frac{4}{125}$
26. $11\frac{7}{80}$
27. $13\frac{5}{16}$
28. $15\frac{3}{800}$
29. $17\frac{11}{160}$
30. $19\frac{9}{820}$
31. $21\frac{25}{64}$

## Article 142.

1. .65.
2. .76.
3. .94.
4. .525.
5. .875.
6. .372.
7. .847.
8. .6625.
9. .874.
10. .8125.
11. .2368.
12. .1544.
13. .30625.
14. .71875.
15. .421875.
16. .528125.
17. .1953125.
18. .1203125.
19. .87890625.
20. .107421875.
21. 1.96.
22. 1.5125.
23. 1.9375.
24. 1.53125.
25. 1.953125.
26. .055555+.
27. .971428+.
28. .531428+.
29. .995833+.
30. .02549019+.

## Article 143.

1. 11.0974.
2. .999999.
3. 250.2505.
4. 100.
5. 12.3456789.
6. 25.
7. 111.111111.
8. 1000.
9. 49.986282579.
10. 106.64125.
11. 160 A.
12. 25 lb.
13. $32.
14. 3350 mi.
15. $42.75.
16. $2880.
17. $178.65.
18. $6400.
19. 7500 T
20. 200 sq. yds.

## Article 144.

1. 88.07.
2. 30.876.
3. 197.874.
4. 899.991.
5. 1169.8713.
6. .73146.
7. 100999.899.
8. 2469.13569.
9. 908990.9089.
10. 5.67.
11. .150105.
12. .2800899.
13. 899.9901
14. 67499.925075.
15. 514.0436.

16. 294.3742815.
17. 3990.56445.
18. 1000.
19. .001.
20. 1.
21. 164.08625 mi.
22. 500.06674.
23. 1010.101.
24. 100.
25. $.15.
26. 49.67125 mi.
27. 3000 bu.
28. $25000.
29. $1280.
30. 1000.

## ARTICLE 147.

1. 37.071.
2. 17.7375.
3. 876.
4. 87.91.
5. 22.4.
6. 64.
7. .11664.
8. 4.29.
9. 1.
10. 30720.2048.
11. 3171.991.
12. 6101.08.
13. 625.
14. 729.06075.
15. 126.
16. 2880.
17. 118.9375.
18. 76864.
19. 99.84.
20. 100.
21. $3840.
22. 448.2 mi.
23. $125.28.
24. $1162.
25. $1050.
26. $183.60
27. $1980.
28. $58.50.
29. 510 mi.
30. 1228.8 bu.
31. $525.
32. $960.
33. $19.80.
34. $1188.
35. $239.61.

## ARTICLE 150.

1. 162.
2. 28.4.
3. 17.4.
4. 8.75.
5. 1.016.
6. .156.
7. .0324.
8. 19.28.
9. 144.
10. .225.
11. 15.625.
12. 1875.
13. .0512.
14. .3125.
15. .032.
16. 1.5625.
17. 2.56.
18. 16.25.
19. 78125.
20. 2.5.
21. 36.4.
22. 19.2 A.
23. 8.25 hrs.
24. $.3125.
25. .6875.
26. 156.25 sec.
27. 125 C.
28. 4.25 T.
29. $3.15.
30. 62.5 rods.
31. 64 gal.
32. 10.8 da.
33. 44.4 bu.
34. 12 hrs.
35. $2500.
36. $4125.
37. 1.25.

## ARTICLE 151.

1. .4 pt.
2. .5 gi.
3. .6 oz.
4. .66 ft.
5. .2178 sq. ft.
6. .08 cu. ft.
7. .1512 min.
8. .144 gr.
9. .252 ℈.
10. .486 sq. in.
11. .648 sec.
12. .315 pt.
13. .39 lb.
14. .12 pt.
15. .4383 hr.
16. .64 sq. rod.
17. .864 gr.
18. .792 ft.
19. .216 sec.
20. .864 cu. in.

## ARTICLE 152.

1. 3 pks. 2 qts. 1 pt.
2. 2 qts. 1 pt. 1 gi.
3. 10 cwt. 10 lb. 10 oz.
4. 40 rds. 2 yds. 2 ft. 3 in.
5. 15 sq. rds. 18 sq. yds. 1 sq. ft. 50.4 sq. in.
6. 1 cu. ft. 864 cu. in.
7. 6 da. 9 hrs. 5 min. 24 sec.
8. 4 oz. 13 pwt. 18 gr.
9. 10 ℥ 3 ℨ 2 ℈ 2 gr.
10. 44 da. 17 hrs. 50 min. 6 sec.
11. 2 pks. 3 qts. 1 pt.
12. 3 qts. 1 pt. 3 gi.
13. 11 cwt. 11 lb. 11 oz.
14. 187 rds. 2 yds. 2 ft. 3 in.
15. { sq.rds.sq. yds.sq.ft.sq. in. } { 93, 18, 1, 50.4 }
16. 4 cu. ft. 864 cu. in.
17. 5 da. 7 hrs. 34 min. 30 sec.
18. 1 oz. 8 pwt. 3 gr.
19. 2 ℥ 7 ℨ 6 gr.
20. 67 da. 2 hrs. 45 min. 9 sec.

## ARTICLE 153.

1. .00875 bu.
2. .02125 gal.
3. .000025 T.
4. .00015625 mi.
5. .00002 A.
6. .0425 C.
7. .000075 wk.
8. .00625 lb.
9. .001875 ℨ.
10. .0036.
11. .828125 bu.
12. .90625 gal.
13. .08875 T.
14. .125 hhd.
15. .675 wk.
16. .28125 lb.
17. .01625 mi.
18. .1225 sq. mi.
19. .475 lb.
20. .55 yr.

## ARTICLE 154.

1. 19.8925.
2. $\frac{5}{32}$; .234375.
3. .4375.
4. 3750.
5. 2.25.
6. $306.18.
7. .98.
8. .74592 gi.
9. .009375 bu.
10. 12 da. 10 hrs. 2 min. 38.4 sec.
11. $283.25.
12. 164.0625.
13. .71875 gal.
14. 5 da. 15 hrs. 6 min. 42 sec.
15. .085.
16. 1.38077.
17. $\frac{11}{32}$; .421875.
18. .3063.
19. 4190.
20. .8.
21. $348.79.
22. 1.2.
23. 3.6 gr.
24. .00015625.
25. 5 da. 21 hrs. 7 min. 12 sec.
26. .921875 bu.
27. 10.14.
28. 1 gal. 3 qts. 1.6 gi.
29. $25.35.
30. 30.
31. .1015625; $\frac{11}{160}$
32. 3750.
33. .2915.
34. $274.58.
35. .2565.
36. .625.
37. 23 A. 134 sq.rds. 12.1 sq. yds.
38. $7.50.
39. $486.22.
40. .65 wk.
41. .6.
42. 16 da. 10 hr. 28 min. 12 sec.
43. .78125 lb.
44. .0015.
45. $168.42.
46. $.75.
47. 24 hr. 9 min.
48. 50 A.
49. $1.50.
50. 169 mi. 136 rods.
51. $180.50.
52. $12750.
53. $18.
54. 25.6 A.
55. $225.
56. 9 bu. 1 pk. 4 qts.
57. $1706.25.
58. 10.9 bls.
59. $20.
60. $1267.50.
61. $11100.
62. $10.80.
63. $68.
64. 250 lb.
65. $2395.80.
66. $70.
67. $9850.
68. 1529.625 gal.
69. $250.
70. 445 mi. 16 rds.
71. $.55.
72. 352 rev.
73. 42 times
74. $139.86.
75. 34.8 hrs.
76. $8.94.
77. 104.72 A.; 374 A.
78. ———
79. 25.

80. A, 130; B, 104; C, 78.
81. .5859375.
82. $100.
83. 255 mi.
84. $3200.
85. 1225 mi.
86. $77.50.
87. 130.5 bu.
88. $4.40.
89. .375.
90. 1 gal. 1 pt.
91. 28 sq. yds.
92. $375.30.
93. $1600.
94. $218.40.
95. 25.
96. 1999.5 mi.
97. 35.85.
98. 500 mi.
99. $445.50.
100. $.75.
101. .45.
102. $1134.
103. $1250.
104. $132.30.
105. 150 mi.
106. $116.50.
107. 54 peach trees.
108. 32 sq. yds.
109. $135.
110. 627 bu.
111. $5500.
112. $379.50.
113. A, $180; B, $225; C, $300.
114. $78.30.
115. $28800.

## ARTICLE 163.

1. $\frac{3}{250}$; .012.
2. $\frac{9}{400}$; .0225.
3. $\frac{1}{32}$; .03125.
4. $\frac{3}{80}$; .0375.
5. $\frac{3}{40}$; .075.
6. $\frac{19}{250}$; .076.
7. $\frac{5}{16}$; .3125.
8. $\frac{13}{40}$; .325.
9. $\frac{19}{50}$; .38.
10. $\frac{7}{16}$; .4375.
11. $\frac{11}{16}$; .6875.
12. $\frac{37}{40}$; .925.
13. $\frac{15}{16}$; .9375.
14. $\frac{9}{8}$; 1.125.
15. $\frac{19}{16}$; 1.1875.
16. $\frac{21}{16}$; 1.3125.
17. $\frac{11}{8}$; 1.375.
18. $\frac{23}{16}$; 1.4375.
19. $\frac{25}{16}$; 1.5625.
20. $\frac{13}{8}$; 1.625.
21. $\frac{3}{800}$; .00375.
22. $\frac{1}{320}$; .003125.
23. $\frac{4}{625}$; .0064.
24. $\frac{39}{4000}$; .00975.
25. $\frac{3}{320}$; .009375.
26. $\frac{1}{500}$; .002.
27. $\frac{1}{250}$; .004.
28. $\frac{1}{200}$; .005.
29. $\frac{3}{2500}$; .0012.
30. $\frac{1}{400}$; .0025.

## ARTICLE 164.

1. 96 A.
2. $20.25.
3. 18 C.
4. 144 rds.
5. 33 min.
6. 32 cts.
7. 84 gal.
8. 385 bu.
9. 1462 lb.
10. 138 horses.
11. 27 men.
12. $400.
13. 1169 sheep.
14. 1400 T.
15. 2241 bls.

16. ₩3567.
17. 6550 men.
18. 9750 mi.
19. 20000 lb.
20. 88880 bu.
21. $30000.
22. 3.5.
23. .015
24. 73.
25. 7.9.
26. 60.75.
27. .0056.
28. 125.
29. 4.05.
30. .0001
31. 11.
32. 9.6.
33. .5555
34. $66\frac{2}{3}$.
35. 756.
36. 46.25.
37. 38.5.
38. 117.
39. 1950.
40. 1386.
41. $\frac{5}{8}$
42. $\frac{5}{9}$
43. $7\frac{1}{2}$
44. $6\frac{3}{10}$
45. $2\frac{3}{4}$
46. $\frac{9}{10}$
47. $4\frac{4}{5}$
48. 10.
49. $38\frac{8}{9}$
50. $90\frac{10}{11}$
51. 1 pt.
52. 35 A.
53. $9.45.
54. 140 men.
55. 5 bls.
56. 75 lb.
57. 135 mi
8. $480.
59. 55 bu.
60. $77.75.
61. $28.
62. 5 T. 3 cwt. 12 lb. 8 oz.
63. 1 lb. 5 oz. 6 pwt. 16 gr.
64. 3 bu. 2 pks. 2 qts.
65. 34 gal. 2 qts. 1 pt. 2 gi
66. 27 lb. 7 ℥ 1 ℥ 1 ℈ 16 gr.
67. 290 A. 145 sq. rds. 13 sq. yds. 6 sq. ft. 108 sq. in.
68. 2 mi. 248 rds. 4 yds. 2 ft. 8 in.
69. 24 C. 78 cu. ft.
70. 260 da. 13 hrs. 4 min. 48 sec.
71. $1666.
72. $5000.
73. 1375 lb.
74. $6.25.
75. $4.20.
76. $396.
77. $75.
78. 6500 lb.
79. $75.25.
80. $87.75.
81. $577.50.
82. $100.
83. $645.
84. $1621.80.
85. $4413.50.
86. $1400.
87. 26.
88. 19.
89. $8540.
90. $492.80.
91. $13125.
92. 33 cts.
93. $27.60.
94. 6 mi.
95. 240.
96. $551.25.
97. 125.
98. $180.
99. 15 lots.
100. 55 cts.
101. $382.50.
102. $99.

## ARTICLE 165.

1. 5 %.
2. 8 %.
3. $7\frac{1}{2}$ %.
4. 12 %.
5. 18 %.
6. $22\frac{1}{2}$ %.
7. 25 %.
8. 36 %.
9. 44 %.
10. $62\frac{1}{2}$ %.
11. $6\frac{2}{3}$ %.
12. 17 %.
13. 24 %.
14. 55 %.
15. 39 %.
16. 64 %.
17. $77\frac{7}{9}$ %.
18. $87\frac{1}{2}$ %.
19. 99 %.
20. 101 %.
21. 135 %.
22. 480 %.
23. 1000 %.
24. 10 %.
25. 400 %.
26. .5 %.
27. $53\frac{1}{3}$ %.
28. $\frac{5}{8}$ %.
29. $83\frac{1}{3}$ %.
30. 120 %.
31. $8\frac{1}{3}$ %.
32. 70 %.
33. 80 %.
34. $6\frac{2}{3}$ %.
35. $\frac{4}{5}$ %.
36. $116\frac{2}{3}$ %.
37. 135 %.
38. .9 %.
39. .01 %.
40. 5 %.
41. 25 %.
42. $43\frac{3}{4}$ %.
43. $92\frac{1}{2}$ %.
44. 35 %.
45. 78 %.
46. 44 %.
47. 15 %.
48. 18 %.
49. 65 %.
50. 68 %.
51. 56 %.
52. $62\frac{1}{2}$ %.
53. 20 %.
54. 4 %.
55. $6\frac{1}{4}$ %.
56. $3\frac{1}{3}$ %.
57. $8\frac{1}{2}$ %.
58. 25 %.
59. $16\frac{2}{3}$ %.
60. 15 %.
61. 35 %.
62. $12\frac{1}{2}$ %.
63. $13\frac{1}{3}$ %.
64. $14\frac{2}{7}$ %.
65. 99 %.

## ARTICLE 166.

1. 740.
2. 125.
3. 450.
4. 560.
5. 6250.
6. 1250.
7. 3240.
8. 3750.
9. 875.
10. 9625.
11. 750.
12. 648.
13. 950.
14. 1225.
15. 18625.
16. 21600.
17. 4.
18. 80.
19. 1260
20. 7550
21. 250.
22. 375.
23. 526.
24. 750.
25. $213\frac{1}{3}$.
26. $187\frac{1}{2}$.
27. 225.
28. $156\frac{1}{4}$.
29. $77\frac{7}{9}$.
30. $109\frac{3}{8}$.
31. $244.
930 men.
33. 1040 bu.
34. 480 mi.
35. 1375 lb.
36. $1750.
37. 140 A.
38. 12000 gal.
39. 36 T.

40. 600 bls.
41. 287 pigeons.
42. $720.
43. $1500.
44. $3840.
45. $600.
46. $146.25.
47. $1102.50.
48. $205.80.
49. $291.25.
50. $139.50.
51. $38.50.
52. $1280.
53. $816.
54. $396.75.
55. $30.
56. 18 cts.
57. $1500.
58. 750 men.
59. 625 sheep.
60. $17820.
61. $10300.
62. $2400.
63. $8700; 55 %; $4785.
64. $4860; 42 %; $2041.20.
65. $7500; 27 %; $2025.
66. $78.
67. $52.50.
68. $3000.

## Article 167.

1. 225.
2. 330.
3. 725.
4. 1050.
5. 1200.
6. 1375.
7. 1650.
8. 2760.
9. 400.
10. 6900.
11. 960.
12. 640.
13. 255.
14. 523.2.
15. 1840.
16. 3720.
17. 1250.
18. 1500.
19. 927.
20. 60.
21. $125.
22. $75.
23. $375.
24. $260.
25. $1040.
26. $3200.
27. $450.
28. $945.
29. $4.75.
30. $68.
31. $4000.
32. $10500.
33. $2750.
34. $3750.
35. $100000.
36. $13500.
37. $6090.
38. $88.60.
39. $1649.
40. $1053.
41. $420.
42. $28.
43. 150 hogs.
44. $80.
45. $1250.

## Article 169.

1. 270 girls.
2. $100.80.
3. 120 sheep.
4. 25 mules.
5. $166.75.
6. Gained $5.
7. $141.
8. $1250.
9. $13600; 38½ %; $5236.
10. $\frac{1}{80}$; 5%; $225; $880; 144.
11. $330.
12. $77.70.
13. $1280.
14. $372.
15. $1050.
16. $840.

17. 20 %.
18. $165.
19. $50.
20. $525.
21. 16 %.
22. $543.
23. $.65.
24. 24 %.
25. $90.
26. $125.
27. $26\frac{2}{3}$ %.
28. $1635.
29. $438.30.
30. 25 %.
31. $100.
32. 6125.
33. Lost $10.
34. $11\frac{1}{9}$ %.
35. $1250.
36. $16\frac{2}{3}$ %.
37. $261.
38. 20 %.
39. $1071.
40. 15 %.
41. 44 %.
42. 612.
43. $16\frac{2}{3}$ %.
44. $2160.

## ARTICLE 172.

1. $92.40.
2. 70.40.
3. 220.20.
4. $3\frac{1}{3}$ %.
5. $2413.25.
6. $2\frac{1}{2}$ %.
7. $1\frac{3}{4}$ %.
8. $2\frac{1}{4}$ %.
9. $71.25.
10. $3160.
11. $2759.90.
12. $3750; $281.25.
13. $241.20.
14. 2500 bu.
15. $3680.
16. $12840.
17. $5760.
18. $12750.
19. $67.65.
20. $167.40.
21. $65.
22. $1875.
23. 650 bls.
24. 5560 bu.
25. 4400 lb.
26. 440 bls.
27. 7000 lb.
28. $111.25.
29. $2401; $147.
30. $7605.
31. $378.
32. $3680; $460.
33. 800 bls.
34. $2304.
35. $3802.50; $175.50.
36. $3763.60.
37. $54.15.
38. $570.37\frac{1}{2}$.
39. $62.40.
40. 1160 bls.; $101.50.
41. 2600 bu.
42. $282.
43. $3360.
44. $3075.
45. 42000 lb.
46. 10000 lb.
47. 1500 bu.

## ARTICLE 173.

1. $756.
2. $950.40.
3. $1080.
4. $731.50.
5. $170.10.
6. $1108.80.
7. $1647.30.
8. $1567.50.
9. $1225.
10. $1262.25.
11. $1071.
12. $1207.50.
13. $845.
14. $750.
15. $480.
16. $1650.
17. $2800.
18. $2750.

19. $1875.
20. $3750.
21. $1750.
22. $1097.20.
23. $900.60.
24. $1250.
25. $2150.
26. $375.
27. $1250.
28. $1077.30.
29. $1195.10.
30. $1237.50.
31. $1500.

## ARTICLES 174 AND 175.

1. $62.50.
2. $75.
3. $2310.
4. $7500.
5. $4755.40.
6. $3458.
7. $9659.125.
8. $1260.
9. 8 %.
10. $16\frac{2}{3}$ %.
11. 14 %.
12. $16\frac{2}{3}$ %.
13. $6\frac{1}{4}$ %.
14. $16\frac{2}{3}$ %.
15. 8 %.
16. $3\frac{3}{4}$ %.
17. $33\frac{1}{3}$ %.
18. $42\frac{6}{7}$ %.
19. $16\frac{2}{3}$ %.
20. 24 %.
21. 15 %.
22. 14 %.
23. $31\frac{1}{4}$ %.
24. $17\frac{1}{2}$ %.
25. $3750.
26. $3250.
27. $12500.
28. $7500.
29. $2256.
30. $2691.
31. $84.
32. $42.
33. $205.80.
34. $4760.
35. $187.
36. $314.50.
37. $126.
38. $141.75.
39. $2062.50.
40. $6525.
41. $512.
42. $255.
43. $951.50.
44. $87.
45. $1050.
46. $800.
47. $315.
48. $4200.
49. $306.25.
50. $144.
51. $328.
52. $546.
53. $680.
54. Nothing.
55. $35 loss.
56. Lost $120.
57. $36
58. Nothing.
59. $162.
60. Gained $72.
61. Neither.
62. $140.
63. $161.20.
64. $40.50.
65. $25.
66. $93.60
67. $2585.
68. $3.20.
69. $1850.
70. $8\frac{1}{3}$ %.
71. 16 %.
72. 1st, $80;
    2d, $120
73. 1st, $60;
    2d, $100
74. 16 %.
75. $350.
76. $2300.
77. $1000.
78. $1.20.
79. $2.25.
80. $100.

## ARTICLES 177 AND 179.

1. $1209.60.
2. $1848.75.
3. $2460.25.
4. $3612.
5. $3367.75.
6. $\frac{4}{5}\%$.
7. 56 shares.
8. $\frac{7}{8}\%$.
9. $586.50.
10. $290.25.
11. 79 shares.
12. 103 shares.
13. 45 shares.
14. 53 shares.
15. 156 shares
16. 135 shares.
17. 104 shares.
18. 95 shares.
19. 98 shares.
20. $3000.
21. $3500.
22. $7500.
23. $10000.
24. 242 shares.
25. 240 shares.
26. $\frac{5}{8}\%$.
27. $\frac{3}{5}\%$.
28. $1366.20.
29. $1627.50.
30. $3800.
31. $3456.
32. $3520.
33. $4400.
34. 160.
35. 140.
36. 120.
37. 10 %.
38. $391.50.
39. $314.50.
40. $833.75.
41. $847.50.
42. 75 shares.
43. 160 shares.
44. 78 shares.
45. 114 shares.
46. 93 shares.
47. 105.
48. 99.
49. $2100.
50. 14 %.
51. 2 %.
52. 68 shares.
53. $12718.75.
54. $10421.25.
55. 106.
56. 105.
57. 108.
58. 107.
59. 105.
60. 104.

## ARTICLE 178.

1. 98 shares.
2. 119 shares.
3. 144 shares.
4. $125700.
5. $87500.
6. $8\frac{1}{2}\%$; $212.50.
7. $431.25.
8. $128500.
9. 117 shares.
10. $7\frac{1}{2}\%$; $337.50.
11. 8 %; $216.
12. $252.
13. $312.50.
14. $175000.
15. $420.
16. 66 shares.
17. 10000 shares.
18. $8\frac{1}{3}\%$.
19. $6\frac{2}{3}\%$.
20. $1215.
21. 150 shares.
22. $21875.

## ARTICLE 180.

1. $625.
2. $325.
3. $510.
4. $455.
5. $225.
6. $297.50.
7. $795.
8. $392.50.
9. $810.
10. $362.50.
11. $122.50.
12. $437.50.
13. $270.
14. $616.
15. $1350.
16. $256.50.
17. $240.75.
18. $362.25.
19. $682.
20. $556.50.
21. $1050.
22. $75.
23. $50.
24. $67.
25. Nothing.
26. The latter by $108.
27. The former by $120.
28. The former by $\frac{1}{4}$ %
29. The latter by $\frac{4}{5}$ %
30. Neither. Nothing.
31. The latter by $23.
32. $132.
33. $7\frac{1}{2}$ %
34. $6\frac{2}{3}$ %
35. $6\frac{2}{5}$ %
36. $8\frac{1}{3}$ %
37. $75.
38. $133\frac{1}{3}$ %
39. 25 % prem.
40. $12\frac{1}{2}$ % dis.
41. 20 % prem.
42. $414.
43. $262.50.
44. $350.
45. $184.
46. $30.
47. $405.
48. $21275.
49. $21460.
50. $26950.
51. $24300.

## ARTICLE 183.

1. $27.51.
2. $43.50.
3. $64.90.
4. $85.59.
5. $118.61.
6. $43.01.
7. $43.75.
8. $93.84.
9. $144.67.
10. $77.50.
11. $73.45.
12. $107.58.
13. $43.40.
14. $24.80.
15. $32.30.
16. $40.25.
17. $33.82.
18. $31.90.
19. $41.86.
20. $27.36.
21. $34.83.
22. $6.02.
23. $6.93.
24. $10.54.
25. $23.87.
26. $511.28.
27. $579.02.
28. $661.08.
29. $623.41.
30. $245.20.
31. $363.78.
32. $546.75.
33. $587.83.

34. $651.20.
35. $783.25.
36. $812.70.
37. $846.16.
38. $886.60.
39. $982.70.
40. $1153.11.
41. $1210.11.
42. $1671.60.
43. $1455.88.
44. $1659.14.
45. $1617.98.
46. $1760.36.
47. $1841.21.
48. $1960.13.
49. $2795.84.
50. $2291.40.

## ARTICLE 184.

1. $60.97.
2. $56.16.
3. $27.20.
4. $74.25.
5. $65.04.
6. $64.35.
7. $122.85.
8. $156.80
9. $72.50.
10. $140.25.
11. $204.45.
12. $91.20.
13. $36.75.
14. $66.15.
15. $44.55.
16. $92.95.
17. $140.40.
18. $130.15.
19. $87.48.
20. $220.15.
21. $169.40.
22. $136.88.
23. $164.50.
24. $274.55.
25. $165.75.
26. $291.55.
27. $1080.32.
28. $1188.95.
29. $1154.52.
30. $1338.75.
31. $1301.80.
32. $1373.50.
33. $1542.50.
34. $1483.02.
35. $1491.95.
36. $1798.50.
37. $1789.20.
38. $1920.45.
39. $1886.50.
40. $1787.15.
41. $2051.40.
42. $2080.65.
43. $2127.10.
44. $2053.50.
45. $2075.52.
46. $2049.30.
47. $2116.50.
48. $2376.
49. $2361.45.
50. $2438.32.
51. $2560.60.

## ARTICLE 185.

1. 1 yr. 1 mo. 6 da.
2. 1 yr. 2 mo. 12 da.
3. 1 yr. 3 mo. 18 da.
4. 1 yr. 4 mo. 15 da.
5. 1 yr. 6 mo. 18 da.
6. 1 yr. 5 mo. 18 da.
7. 1 yr. 7 mo. 24 da.
8. 1 yr. 9 mo. 18 da.
9. 1 yr. 10 mo. 15 da.
10. 1 yr. 11 mo. 6 da.
11. 2 yrs. 1 mo. 6 da.
12. 2 yrs. 1 mo. 24 da.

13. 2 yrs. 3 mo. 9 da.
14. 2 yrs. 7 mo. 6 da.
15. 2 yrs. 9 mo. 21 da.
16. 2 yrs. 11 mo. 12 da.
17. 3 yrs. 1 mo. 24 da.
18. 3 yrs. 3 mo. 18 da.
19. 3 yrs. 9 mo. 27 da.
20. 3 yrs. 6 mo. 9 da.
21. 1 yr. 8 mo. 21 da.
22. 1 yr. 8 mo. 3 da.
23. 2 yrs. 3 mo. 6 da.
24. 3 yrs. 6 mo. 9 da.
25. 1 yr. 2 mo. 12 da.
26. 2 yrs. 7 mo. 15 da.
27. 3 yrs. 5 mo. 18 da.
28. 8 mo. 21 da.
29. 10 mo. 24 da.
30. 9 mo. 27 da.

## ARTICLE 186.

1. 4 %.
2. $4\frac{1}{2}$ %.
3. 5 %.
4. $5\frac{1}{2}$ %.
5. 6 %.
6. $6\frac{1}{2}$ %.
7. 7 %.
8. $7\frac{1}{2}$ %.
9. 8 %.
10. $8\frac{1}{2}$ %.
11. 9 %.
12. $9\frac{1}{2}$ %.
13. 10 %.
14. $6\frac{2}{3}$ %.
15. $6\frac{3}{4}$ %.
16. $3\frac{1}{3}$ %.
17. 4 %.
18. $4\frac{1}{2}$ %.
19. 5 %.
20. $5\frac{1}{2}$ %.
21. 6 %.
22. $6\frac{1}{2}$ %
23. $6\frac{2}{3}$ %
24. 7 %.
25. $7\frac{1}{2}$ %.
26. 8 %.
27. $8\frac{1}{3}$ %.
28. 9 %.
29. 10 %.
30. 12 %.

## ARTICLE 187.

1. $250.
2. $320.
3. $375.
4. $420.
5. $540.
6. $570.
7. $620.
8. $695.
9. $725.
10. $775.
11. $790.
12. $830.
13. $885.
14. $940.
15. $970.
16. $985.
17. $1025.
18. $1080
19. $1110.
20. $1175.
21. $1220.
22. $1265.
23. $1325.
24. $1380.
25. $1445.
26. $1575.
27. $1664.
28. $1750.
29. $1895.
30. $1970.

## ARTICLE 188.

1. $270.
2. $325.
3. $380.
4. $450.
5. $475.
6. $520.
7. $580.
8. $640.
9. $675.
10. $738.
11. $775.
12. $835.
13. $895.
14. $925.
15. $987.
16. $995.
17. $1050.
18. $1180.
19. $1260.
20. $1290.
21. $1350.
22. $1425.
23. $1470.
24. $760.
25. $1625.
26. $342.36.
27. $390.50.
28. $90.16.
29. $84.06.
30. $125.55.
31. $144.
32. $187.05.
33. $199.50.
34. $209.
35. $154.35.
36. $90.
37. $152.50.
38. $399.75.
39. $432.
40. $266.64.

## ARTICLE 190.

1. $282.36.
2. $289.43.
3. $437.48.
4. $141.43.
5. $239.04.
6. $366.42.
7. $370.32.
8. $377.13.
9. $521.67.
10. $2613.32.
11. $1223.58.
12. $893.73.
13. $831.48.
14. $1135.71.
15. $956.97.
16. $702.25.
17. $808.96.
18. $1418.76.
19. $1922.96.
20. $1796.85.

## ARTICLE 191.

1. $104.69.
2. $56.40.
3. $120.48.
4. $370.68.
5. $142.29.
6. $264.99.
7. $172.80.
8. $406.84.
9. $504.42.
10. $626.25.
11. $1168.31.
12. $1654.60.
13. $1018.35.
14. $1363.25.
15. $2824.08.
16. $2670.75.
17. $1458.90.
18. $3233.28.
19. $2304.
20. $2538.90.
21. $0.89.

## Miscellaneous Problems in Interest.

1. $2230.99.
2. 2 yrs. 8 mo. 12 da.
3. 7 %
4. $795.
5. $88.80.
6. $113.01.
7. $2136.60.
8. $5.35.
9. $73.50.
10. $1.88.
11. $1398.60.
12. Dec. 21, 1894.
13. 7 %
14. $575
15. $148.20.
16. $137.75.
17. $2094.85.
18. $50.70.
19. $18.40.
20. $0.69.
21. $443.33.
22. June 30, 1896.
23. $7\frac{1}{2}$ %
24. $555.
25. $480.
26. $1801.54.
27. $872.64.
28. $47.60.
29. $7.81.
30. $5.20.
31. $2393.08.
32. 1 yr. 9 mo. 18 da.
33. $5\frac{1}{2}$ %
34. $1250.
35. $208.25.
36. $1154.24.
37. $1068.30.
38. $0.85.
39. $1085.28.
40. 2 yrs. 3 mo. 4 da
41. $7\frac{1}{2}$ %
42. $500.
43. $1350.
44. $2185.60.
45. $2049.22.
46. $1992.90.
47. 1 yr. 7 mo. 24 da.
48. 8 %
49. $1500.
50. $85.26.
51. $1871.38.
52. $1387.84.
53. $1.31
54. $1035.715.
55. 1 yr. 10 mo. 6 da.
56. 10 %
57. $1875.
58. $472.50.
59. Int., $359.55; Amount, $1959.55.
60. $257.01.
61. $10.87.
62. $269.71.
63. May 22, 1897.
64. $4\frac{1}{2}$ %
65. $420.
66. $2400.
67. $1562.98.
68. $2552.83.
69. $2175.60.
70. $0.43.

## Article 192

1. $613.80.
2. $622.80.
3. $1261.80.
4. $629.20.
5. $499.50.
6. $631.76.
7. $370.92.
8. $621.60.
9. $321.
10. $401.25.
11. $643.20.
12. $634.80.

13. $1746.06.
14. $500.
15. $423.70.
16. $293.15.
17. $797.25.
18. $240.35.
19. $462.66.
20. $993.
21. $500.40.
22. $262.
23. $1755.
24. $370.92.
25. $997.80.
26. $998.75
27. $1848.25
28. $1200.

## ARTICLE 196.

1. April 4–7, 1888; $7.44; $472.56.
2. November 19–22, 1889; $18.70; $531.30.
3. September 15–18, 1890; $7.98; $562.02.
4. November 1–4, 1889; $14.45; $835.55.
5. June 4–7, 1890; $15.54; $724.46.
6. $1259.70.
7. $1335.15.
8. $1418.40.
9. $1517.10.
10. $343.70.
11. $1416.96.
12. $35.75; $1589.25.
13. $331.65.
14. $147.
15. $274.89.
16. $2685.15.
17. $686.25.
18. $935.68.
19. $549.60.
20. $403.04.
21. $716.10.
22. $1040.55.
23. $1218.75.
24. $1480.
25. $526.75.
26. $5.27; $521.73.
27. $31.62; $1944.63.
28. $1014.01.
29. $2040.39.
30. $1224.49.
31. $16.11; $1057.89.
32. $682.11.
33. $11.05; $541.45.
34. $7.08; $464.92.
35. $618.75.
36. $1242.57.
37. $789.39.
38. $2076.46.
39. $31.02; $1519.98.
40. $45.50; $1774.50.
41. $759.99.
42. $1218.05.
43. $744.12.

## ARTICLE 197.

1. $550.
2. $480.
3. $370.
4. $1250.
5. $10.78.
6. $52.70.
7. $5.55.
8. $945.
9. $1760.
10. $1575.
11. $625.
12. $840.
13. $1640.
14. $1350.
15. 1000 bu.
16. $75.
17. $480.
18. $12.50.
19. $800.
20. $575.
21. $2000.
22. $625.
23. $865.

## ARTICLE 199.

1. $975; $177.45.
2. $1025; $237.80.
3. $520; $70.20.
4. $720; $98.64.
5. $565.
6. $176.25.
7. $1250.
8. $675.
9. $123.25.
10. $194.35.
11. $31.21.
12. $16.85.
13. $14.24.
14. $9.46.
15. $19.44.
16. $36.10.
17. $873.20.
18. $1451.
19. $3305.
20. $1216.20.
21. $44.95.
22. $33.54.
23. $24.85.
24. The former by $33.60.
25. The latter by $36.
26. $924; $92.40.
27. $640; $57.60.
28. $847.50; $61.02.
29. $1587.50; $127.
30. $1392.40; $208.86.
31. $1682; $201.84.
32. $4.90.
33. $118.58.
34. $5.29.
35. $109.35.
36. $39.30.
37. $6.48.
38. $12.15.
39. $17.15.
40. $32.40
41. $9.

## ARTICLE 201.

1. $1857.40.
2. $1550.25.
3. $1762.25.
4. $2231.60.
5. $1680.
6. $1950.
7. $1440.
8. $1375.
9. $\frac{3}{4}\%$ dis.

10. $\frac{3}{10}\%$.
11. $\frac{1}{2}\%$.
12. $\frac{3}{5}\%$ prem.
13. $1388.80.
14. $961.35.
15. $1320.
16. $880.
17. $1197.
18. $728.90.
19. $1189.50.
20. $942.72.
21. $840.
22. $480.
23. $750.
24. $1250.
25. $1040.
26. $725.40.
27. $545.05.
28. $618.75.
29. $1350.
30. $580.
31. $660.
32. $\frac{3}{4}\%$.
33. $\frac{7}{10}\%$ prem.
34. $\frac{4}{5}\%$ dis.
35. $\frac{9}{10}\%$ dis.
36. $725.
37. $1744.75.
38. $1875.
39. $880.
40. $1745.92.
41. $1560.
42. $1000.

## ARTICLE 204.

1. $31.36.
2. $105.
3. $61.19.
4. $153.75.
5. $93.05.
6. $102.75.
7. $370.50.
8. $2\frac{1}{2}\%$.
9. $1\frac{3}{4}\%$.
10. $1\frac{4}{5}\%$
11. $2\frac{3}{4}\%$.
12. $3\frac{1}{3}\%$.
13. $1840.
14. $4860.
15. $3800.
16. $5600.
17. $4900.
18. $5200.
19. $3570.
20. $6640.
21. $4120.
22. $5850.
23. $5125.
24. $5895.
25. $253000.
26. $\frac{4}{5}$
27. $\frac{7}{8}$
28. $\frac{3}{4}$
29. $\frac{9}{10}$
30. $\frac{5}{6}$
31. $250.
32. $23200.
33. $34740.
34. $1\frac{1}{2}\%$.

## ARTICLES 208 AND 209.

1. .024.
2. .027.
3. $165000.
4. $240625.
5. .021.
6. $12442.15.
7. $128720.
8. 17 mills.
9. $26.25.
10. .027; $42.12.
11. $225750.
12. $7938.
13. $5529.25.
14. $288750.
15. $1354.50.
16. $830500.
17. $947.70.
18. .016; $17.35.

19. .021; $61.50.
20. 28 mills; $122.
21. .018; $19.60.
22. $33.50.
23. $29.30.
24. .024; $84.90.
25. 14 mills; $46.25.
26. $45.05.
27. 19; $53.75.
28. $324500.
29. $2500.
30. $11124.65.
31. $3564.75.

## ARTICLE 214.

1. 8.
2. 17.
3. 7.
4. $6\frac{1}{4}$
5. $26\frac{1}{4}$
6. $16\frac{2}{3}$
7. 37.
8. $9\frac{3}{8}$
9. $3\frac{3}{5}$
10. $6\frac{2}{3}$
11. .7.
12. $\frac{5}{9}$
13. .8.
14. $\frac{11}{14}$
15. $\frac{9}{10}$
16. .19.
17. .015.
18. $\frac{15}{16}$
19. $\frac{5}{8}$
20. .75.
21. $1\frac{3}{32}$
22. 1.9.
23. $2\frac{3}{4}$.
24. 28.
25. 120.
26. 17.6.
27. $1066\frac{2}{3}$
28. 1250.
29. 1600.
30. 12.5.
31. 987.

## ARTICLE 215.

1. 567.
2. 54.
3. 200.
4. 252.
5. 67.2.
6. $\frac{7}{12}$
7. $\frac{2}{5}$
8. 30.
9. 97.5.
10. 5.
11. 16.5
12. 840.
13. 909.
14. 1.
15. 3.

## ARTICLE 216.

1. 95.
2. .3
3. $12\frac{1}{2}$
4. $\frac{8}{15}$
5. 156.
6. .87.
7. $3\frac{1}{9}$
8. 92.5.
9. 1440.
10. $.58\frac{1}{3}$.
11. 915.
12. $1666\frac{2}{3}$
13. $44\frac{4}{9}$
14. 6.875.
15. 10000.

## ARTICLE 217.

1. $2\frac{1}{2}$
2. $1\frac{3}{10}$
3. $6\frac{2}{5}$
4. $4\frac{1}{2}$
5. 5.
6. 24.
7. 96.
8. 4.
9. 11.
10. 100.

## ARTICLE 219.

1. 7 : 2.
2. 23 : 17.
3. 25 : 21.
4. 19 : 15.
5. 12 : 5.
6. 13 : 11.
7. 9 : 8.
8. 16 : 13.
9. 17 : 19
10. 11 : 15.
11. 12 : 17.
12. 14 : 25.
13. 7 : 9.
14. 13 : 19.
15. 16 : 17.

## ARTICLE 220.

1. 81 : 50.
2. 225 : 68.
3. 20 : 9.
4. 63 : 16.
5. 8 : 3.
6. 44 : 15.
7. 11 : 6.
8. 7 : 3.
9. 32 : 45.
10. 27 : 35.
11. 63 : 320.
12. 10 : 21.
13. 128 : 195.
14. 9 : 25.
15. 7 : 11.

## ARTICLE 223.

1. 42.
2. 65.
3. 36.
4. 29.
5. 70.
6. 75.
7. $140\frac{5}{8}$
8. $46\frac{7}{8}$
9. 27.
10. $6\frac{3}{4}$
11. $20\frac{1}{4}$
12. 52.
13. 7.
14. $\frac{14}{15}$
15. 1.8.
16. 30.

## ARTICLE 224.

1. $84.80.
2. $16.80.
3. 18 men.
4. $14.40.
5. 3.5 hrs.
6. $\frac{9}{10}$ bl.
7. $104.06.
8. 2 da.
9. 185 yds.
10. 102 da.
11. 55 A.
12. 39 men.
13. 60 cts.
14. $7\frac{1}{2}$ bls.
15. 6 rds.
16. 195 bu.
17. 119 ft.
18. $17\frac{1}{8}$ T.
19. 6 men.
20. $136.50.
21. $51.60.
22. $45.
23. 100 ft.
24. $714.
25. 315 mi.
26. 100 hogs.
27. $47.25.
28. 52 rds.
29. 6 pipes.
30. $6\frac{4}{5}$ T.
31. 100 ft.
32. 48 yds.
33. 8 wks.

34. 297 men.
35. $605.55.
36. $1650.
37. 135 bu.
38. $37\frac{1}{2}$
39. $675.
40. 18 men.
41. $138.
42. 195 ft.
43. 250.
44. 48 ft.
45. 14 hrs.
46. 91 hrs.
47. $558.
48. 9 oz.
49. $66\frac{2}{3}$ bls.
50. 552 bu. 1 pk.
51. 96 mi.
52. $53\frac{1}{3}$
53. $18\frac{5}{8}$ bls.
54. $85\frac{1}{2}$ ft.
55. $790.
56. $81.
57. $\frac{7}{8}$ bl.
58. $2.50.
59. $47\frac{1}{4}$ mi.
60. $23\frac{1}{4}$ bls.
61. $\frac{5}{8}$ of it.
62. $48.
63. $96\frac{1}{4}$
64. $8\frac{6}{7}$ yds.
65. 93 T.
66. $16\frac{2}{3}$ bls.
67. 5.
68. 578 ft.

## ARTICLE 225.

1. 20 da.
2. 25 men.
3. $170.10.
4. $132.30.
5. 4536 lb.
6. 510 ft.
7. $25926.
8. $275968.
9. 50 da.
10. $94.50.
11. 10 hrs.
12. 4320 tiles.
13. $82320.
14. $1267.20.
15. $520.
16. $750.
17. 108 yds.
18. 325 mi.
19. 67600 lb.
20. 27 sheep.
21. $3\frac{1}{3}$ da.
22. 10 car.
23. 2880 T.
24. 2 mi. 32 rds.
25. 21 men.
26. $680.
27. 2 yrs. 4 mo. 15 da.
28. 6 mo.
29. 14 cows.
30. 35 da.
31. 55 bales.
32. 1000 rats.
33. $13200.
34. $240.
35. 8 %.
36. 8 hrs.
37. 8 da.
38. 10 hrs.

## ARTICLES 226 AND 229.

1. A, $85; B, $119; C, $153.
2. First, $288; Second, $200.
3. A, $1225; B, $875.
4. A, $306; B, $324; C, $369.
5. 108 and 142.5.

6. 103.5 and 172.5.
7. 210, 262.5, and 307.5.
8. 2955 and 2758.
9. A, $340; B, $408; C, $357.
10. A, $752; B, $846; C, $987.
11. A, $750; B, $1125; C, $1200.
12. A, $153; B, $127.50; C, $119.
13. A, $330; B, $346.50; C, $363.
14. A, $492.80; B, $528; C, $580.80.
15. 1st, $1050; 2d, $1323; 3d, $1701.
16. $861, $798, $735, $609.
17. A, $50; B, $70; C, $90.
18. C, 200; D, 252; E, 300 A.
19. A, 30 T.; B, 36 T.; C, 42 T.
20. E, $90; F, $135.
21. $33.
22. A, $99; B, $40.50.
23. First, $33.75; Second, $27.
24. 1st, $6250; 2d, $5500; 3d, $4750; 4th, $4000.
25. A, $156.25; B, $175; C, $168.75.
26. A, $157.50; B, $178.50; C, $189.
27. A, $382.50; B, $455; C, $412.50.
28. A, $187.50; B, $243; C, $304.50; D, $372.
29. A, $1815; B, $2077; C, $2222.50; D, $2460.50.
30. Smith, $575; Brown, $690.
31. A, $\frac{5}{9}$; B, $\frac{4}{9}$.
32. $1200.
33. $675.
34. $375.
35. $1125.
36. $550.
37. $800.
38. A, $301; B, $344.
39. A, $1120; B, $1015.
40. C, $525; D, $595.
41. E, $320; F, $400.
42. A, $708.75; B, $761.25.
43. C, $262.50; D, $247.50.
44. A, $2000; B, $2000; C, $2000.

## ARTICLE 227.

1. $87\frac{1}{2}$ cts.
2. 85 %
3. $775.
4. $188.40.
5. $722.50.
6. $555.20.
7. A, $2059.20; B, $2739; C, $3418.80; D, $3976.50.
8. A, $233.60; B, $269.60; C, $280; D, $296.80.
9. $10500.
10. $175000.
11. $27500.
12. $9375.
13. $10800.

## ARTICLE 228.

1. $4\frac{1}{2}$ %
2. $2\frac{1}{2}$ %; $40.62\frac{1}{2}$.
3. $2256.25.
4. $80.
5. $1840.
6. $2450.
7. $135.
8. B, $158.40; C, $297.90.
9. $75000.
10. $50000.

## ARTICLE 230.

1. 3 mo. 5 da.
2. 5 mo. 6 da.
3. 8 mo.
4. 6 mo. 20 da.
5. 45 da.
6. 3 mo.
7. 4 mo. 15 da.
8. 7 mo.
9. 70 da.
10. 90 da.
11. 7 mo. 15 da.
12. 6 mo.
13. 6 mo. 15 da.
14. 4 mo.
15. 38 da.
16. Feb. 4.
17. April 13.
18. June 7.
19. July 8.
20. Sept. 5.
21. July 15.
22. Dec. 14
23. Oct. 28.
24. July 1, 1892.
25. Dec. 31, 1891.

## ARTICLE 232.

1. 30 cts.
2. $2.48.
3. $1.55.
4. $10.50.
5. $75.
6. $1.28.
7. 3 hrs. 33 min.
8. $8.50.
9. $4.60.
10. $1.70.
11. 1 T. 1 cwt. 50 lb.

12. 15 min. 16 sec.
13. 80 cts.
14. $100.
15. 97 cts.
16. 5 lb. 1 oz 22 gr.
17. $4.55.
18. 16 cts.
19. $5.40.
20. 31 gal. 1 qt. 1 pt. 1 gi.
21. 4 mi. 78 rds. 5 yds.
22. 10 cts.
23. $5.
24. $25.
25. $100.
26. 30 cts.

## ARTICLE 234.

1. 8649.
2. 50653.
3. 456976.
4. 40 84101.
5. 2284.84.
6. 456.533.
7. $915\frac{1}{16}$
8. $1111\frac{1}{9}$
9. $1371\frac{541}{729}$
10. $34\frac{191}{15625}$
11. 62001.
12. 3164 0625.
13. $5439\frac{1}{16}$
14. $\frac{2562}{625}$
15. $13\frac{13}{324}$
16. $291\frac{1}{289}$
17. $736\frac{36}{49}$
18. $64\frac{321}{400}$
19. 351.5625.
20. 59319.
21. 2460375.
22. 1295029.
23. $4629\frac{17}{27}$
24. 1771.561.
25. 15438249.
26. $\frac{4096}{15625}$
27. 1367.631.
28. $74\frac{11}{125}$
29. 43046721.
30. 676.5201.
31. $915\frac{1}{16}$
32. $4822\frac{43}{81}$
33. 3164.0625.
34. 1048576.
35. $\frac{506255}{65536}$
36. $15241\frac{37995}{65536}$
37. $162\frac{1663}{2401}$
38. 161051.
39. 51.53632.
40. $411\frac{127}{243}$
41. $9536\frac{761}{1024}$
42. 5032.84375.
43. 105101100501.

## ARTICLE 238.

1. 17.
2. 39.
3. 65.
4. 93.
5. 99.
6. 136.
7. 184.
8. 259.
9. 375.
10. 499.
11. 563.
12. 591.
13. 607.
14. 696.
15. 758.
16. 888.
17. 909.
18. 1001.
19. 1111.
20. 1776.
21. 2.1.

22. 6.8.
23. .13.
24. 1.07.
25. .056.
26. .125.
27. .0347.
28. 18.8.
29. 1.99.
30. .0625.
31. .3003.
32. $\frac{6}{8}\frac{8}{9}$
33. $\frac{8}{9}\frac{2}{1}$
34. $\frac{1}{2}\frac{4}{6}\frac{5}{7}$
35. $\frac{2}{3}\frac{5}{5}\frac{6}{9}$
36. 2.937.
37. $31\frac{1}{4}$
38. $43\frac{1}{3}$
39. $65\frac{5}{12}$
40. 5.05964+

## ARTICLE 239.

1. 30.
2. 24.
3. 42.
4. 96.
5. 54.
6. 78.
7. 84.
8. 105.
9. 231.
10. 165.
11. 210.
12. 462.
13. 252.

## ARTICLE 240.

1. .14949375.
2. $(18.09)^2$ and $(14.03)^2$.
3. 1.
4. $\frac{19}{178}$
5. 390600.
6. $(26.02)^2$ and $(\frac{67}{83})^2$.
7. $507.50.
8. $232.
9. $148.50
10. $222.25.
11. $442.40.
12. $215.
13. $315.
14. $322.50.
15. $387.60.
16. 232.
17. 224.
18. 270.
19. 445 yds.
20. 165 ft.
21. 253 yds.
22. 785 yds.
23. 51 ft.
24. $52\frac{1}{2}$ ft.
25. 121 ft.
26. 193 mi.
27. $64\frac{2}{7}$ ft.
28. $41\frac{2}{3}$ ft.
29. 63 ft.
30. 46 ft.
31. 337 mi.
32. 637 mi.
33. 636 mi.
34. 48 yds.
35. 24 rds.
36. 30 rds.
37. 18 rds.
38. 14 rds.
39. 74 ft.
40. 48 ft.
41. 28 rds.
42. 10 rds.
43. 42 rds.
44. 679 mi.
45. 24 rds.
46. 241 ft.
47. 133 ft.
48. 73 ft.
49. 43 ft. 6 in.
50. 49 ft. 6 in.
51. 28 A. 128 sq. rds.
52. 19 A. 2 sq. rds.
53. 150 rds.

## ARTICLE 244.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | 26. | 11. | 191. | 21. | 3.33. | 31. | 105. |
| 2. | 31. | 12. | 268. | 22. | .001. | 32. | 71.1. |
| 3. | 38. | 13. | 357. | 23. | 1.9238+. | 33. | 1.1. |
| 4. | 47. | 14. | 474. | 24. | $\frac{13}{19}$ | 34. | 12. |
| 5. | 55. | 15. | 625. | 25. | $\frac{77}{98}$ | 35. | 6. |
| 6. | 69. | 16. | .29. | 26. | $\frac{101}{111}$ | 36. | 7. |
| 7. | 73. | 17. | .067. | 27. | $\frac{68}{97}$ | 37. | 9. |
| 8. | 82. | 18. | .456. | 28. | $19\frac{4}{5}$ | 38. | 3. |
| 9. | 94. | 19. | 9.9. | 29. | $11\frac{5}{6}$ | 39. | 66. |
| 10. | 110. | 20. | 78.1. | 30. | $10\frac{5}{7}$ | 40. | 288. |

## ARTICLE 245.

1. 84 ft.
2. 4 ft. 6 in.
3. $43.
4. 18 ft.
5. 72 ft.
6. 30.25 sq. ft.
7. 187 sq. ft. 6 sq. in.
8. 253 sq. ft. 72 sq. in.
9. $85.75.
10. $76.05.
11. $16.20.
12. $110.94.
13. 48 sq. ft.
14. 2 ft. 9.6 in.
15. 42.875 cu. ft.
16. $2 \times 2 \times 6$ ft.
17. Dim. $2\frac{1}{2} \times 2\frac{1}{2} \times 10$ ft.; surface $112\frac{1}{2}$ sq. ft.
18. Contents 10.125 cu. ft.; dim. $1.5 \times 1.5 \times 4.5$ ft
19. 216.
20. 15 in.
21. 1 mile.

## ARTICLE 247.

1. 1 sq. yd.
2. 43 A. 32 sq. rds.
3. 35 A. 25 sq. rds.
4. 10 A.
5. 4000 ft.
6. 900 tiles.
7. $90.
8. 24 ft.
9. $50.
10. 14 yds.
11. 55 yds.
12. $229.68.
13. 6 rds.
14. 49 yds.
15. 14 A. 64 sq. rds.
16. 30 rds.

## ARTICLE 248.

1. 490 sq. ft.
2. 10 A. 120 sq. rds.
3. 16800 sq. ft.
4. $520.
5. $2250.
6. 24 ft.
7. 38 rds.
8. 50 ft. and 70 ft.
9. 125 ft.
10. 60 rds. and 75 rds.

## ARTICLE 249.

1. 33 sq. yds.
2. 304 sq. yds.
3. 9 A. 65 sq. rds.
4. $302.50.
5. 48 rds. and 80 rds.
6. 70 sq. yds.
7. 6 A. 54 sq. rds.
8. $43\frac{7}{11}$ sq. rds.
9. 14 A. 100 sq. rds.; $1170.
10. $16.50.
11. $27.60.
12. Nothing.
13. 307.92 sq. yds.

## ARTICLE 250.

1. 910 sq. yds.
2. 120 sq. rds.
3. $60.
4. 132 sq. rds.
5. $1365.
6. $4950.
7. 118 A. 74 sq. rds.
8. 82 A. 110 sq. rds.
9. $3162.
10. $3876.

## ARTICLE 251.

1. 392.7 ft.
2. 1 mi. 108.4 rds.
3. 135 ft.
4. 66 ft. 8 in.
5. $\frac{1}{2}$ mi.
6. 4 ft. 6 in.
7. 7 mi. 140 rds.
8. 112 ft. 6 in.
9. $117.81.
10. 25 ft.
11. 251.328 ft.
12. 14.28 rds.
13. 4 yrs. 109 da. 19 hrs. 12 min.

## ARTICLE 252.

1. 16 sq. rds. 6 sq. yds. 7 sq. ft. 126 sq. in.
2. 59 A. 63.34 sq. rds.
3. 1 A. 154.16 sq. rds.
4. $261.80.
5. $706.86.
6. 47 ft. 6 in.
7. 72 ft. 6 in.
8. 64.909 sq. rds.
9. $327.25.
10. Ground, $15708; fence, $942.48.
11. 50 A. 148.71 sq. rds.
12. 115 sq. rds. 11 sq. yds. 8 sq. ft. 36 sq. in.
13. 156.25 ft.
14. 4 A. 74 sq. rds.

## ARTICLE 254.

1. 32 sq. ft. 12 sq. in.
2. 30 sq. ft.
3. 10 sq. yds.
4. 55 sq. ft.
5. 5 sq. ft. 65.4 sq. in.
6. 39 sq. ft. 78.15 sq. in.
7. 26 sq. ft. 25.92 sq. in.

## ARTICLE 255.

1. 135 cu. in.
2. 1500 cu. in.
3. $2\frac{1}{2}$ cu. ft.
4. $200.
5. 6 cu. ft. 234.9 cu. in.
6. 11 cu. ft. 627 cu. in.
7. 60 ft.

## ARTICLE 256.

1. 15 sq. ft.
2. 27 sq. ft.
3. $56\frac{1}{4}$ sq. ft.
4. $31\frac{2}{3}$ sq. ft.
5. 2 sq. ft. 104.7 sq. in.
6. 19 sq. ft. 111.075 sq. in.
7. 54 sq. ft. 78 sq. in.

## ARTICLE 257.

1. 33 cu. yds.
2. 18 cu. ft.
3. 150 ft.
4. 1120 cu. yds.
5. 196.35 cu. ft.
6. 19.635 cu. ft.
7. 26 ft. 8 in.

## ARTICLE 258.

1. 13 sq. ft. 91.5 sq. in.
2. 19 sq. ft. 91.44 sq. in.
3. $56.55.
4. 145 sq. yds. 4 sq. ft.
5. 25 globes.

## ARTICLE 259.

1. 303 cu. ft. 16 cu. in.
2. 7.65 gal.
3. 13824.
4. $51.13.
5. 4 ft. 2 in.

## ARTICLE 261.

1. 15 ft.
2. $41.25.
3. $145.80.
4. $32.
5. 52 ft.
6. $17.60.

## ARTICLE 262.

1. 1000 perches.
2. 120 perches.
3. $240.
4. 11520 bricks.
5. $157.08.
6. $85.

## ARTICLE 263

1. 900 bu.
2. 810 bu.
3. 93 bu. 3 pks.
4. 450 bu.
5. 173.56 bu.
6. 1615.68 gal.
7. 9072 gal.; 288 bls.
8. 103680 bls.
9. 14688 gal.
10. 616 cu. ft.; 4608 gal.; 495 bu.

## ARTICLE 265.

1. 1210.
2. 25.
3. $64\frac{4}{5}$
4. 99.
5. 30 mi.
6. $1.25.
7. $32.50.

## ARTICLE 266.

1. 5.
2. 24.
3. $\frac{2}{3}$
4. .5.
5. $125.
6. $1\frac{3}{4}$ mi.
7. 15 cts.

## ARTICLE 267.

1. 2700.
2. 4464.
3. 5304.
4. 4545.
5. 340000.
6. 8775.
7. $19\frac{1}{2}$ mi.
8. $961.
9. $18750.
10. $50000.

## ARTICLE 269.

1. 2048.
2. 45927.
3. $\frac{1}{49}$
4. 9.
5. .25.
6. 1000000.
7. $655\frac{9}{25}$
8. $1771.561.

## ARTICLE 270.

1. 4095.
2. 4372.
3. 5242875.
4. 4.
5. 2901.25.
6. 34.56.
7. $2047500.

## MISCELLANEOUS PROBLEMS.

1. $75.
2. $35 or $65.
3. 41 ft. 3 in.
4. 69.6 ft.
5. 42 eggs.
6. 45 eggs.
7. 2 sq. ft. 112 sq. in.
8. 22 ft. 6 in. square; 11 ft. 3 in. high.
9. 15%.
10. $31\frac{1}{4}$%.
11. 8%.
12. $12\frac{1}{2}$%.
13. 122.84 sq. ft.
14. 1470 sq. yds.
15. 16 sq. ft. 96 sq. in.
16. $2535.
17. 90 ft.
18. 12 rds.
19. $1208.59.
20. 4 hrs.; 1 hr. 36 min; 15 min.
21. First $2200; 2d $2750.
22. 77440 A.
23. 113.975+ ft.
24. $4.
25. A, $4200; B, $3600; C, $3150; D, $2800.
26. 30 days.
27. 98.
28. Son's share, $10000; Dau.'s, $7500 Wid.'s, $6000
29. 1021 cents.
30. (*a*) 11.2 × 8.4 × 6.3 feet. (*b*) 8.4 feet.

## SUGGESTIONS TO TEACHERS.

In the applications of the square root it is desirable to become acquainted with some curious properties of numbers, which will enable the teacher to write a great variety of concrete problems for class work. All teachers understand the construction of right-angled triangles whose sides are in the ratios of 3, 4, and 5. But it frequently happens that the instructor desires to use other numbers than those, and lest every one should not know how to obtain them, I will give two different methods of forming such triangles.

1st. Take any two *unequal* numbers. Then the sum of their squares, the difference of their squares, and twice their product, will be the sides of a right-angled triangle.

Example: Take 7 and 4. $7^2 + 4^2 = 65$. $7^2 - 4^2 = 33$. $7 \times 4 \times 2 = 56$. And the sides are 33, 56, and 65.

2d. A tree of any given height (say 80 ft.) is broken by the wind in such a way that the top strikes the ground at a distance of 20 ft. from the base of the tree. How long is the part left standing?

Solution: Square the height of the tree. Subtract the square of the distance at which the top strikes the ground, and divide the remainder by twice the height of the tree. The quotient will be the length of the part left standing: that is, $80^2 = 6400$; $20^2 = 400$; $6400 - 400 = 6000$; $6000 \div 160 = 37\frac{1}{2}$ ft., and the hypotenuse will be $80 - 37\frac{1}{2} = 42\frac{1}{2}$ ft. Therefore the sides are $37\frac{1}{2}$ ft., 20 ft., and $42\frac{1}{2}$ ft.

Again: Suppose we wish to find the exact diagonal of a regular parallelopipedon. That diagonal must be

the square root of the sum of the squares of its three dimensions. Take any two *consecutive* whole numbers. Then add the sum of their squares to the square of their product, and extract the square root. (The numbers and their product are the three dimensions.)

Example: Take 7 and 8. Then $7^2 + 8^2 + 56^2 = 3249$, and $\sqrt{3249} = 57$, which is the answer. It is interesting to know that the product of the two numbers + 1 is the answer in every case.

Again: It is well known that the exact diagonal of any given cube can not be found, but the diagonal of any regular half-cube may be easily obtained.

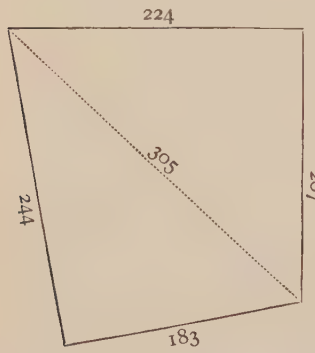
Example: A room is 18 ft. square and 9 ft. high. What is the length of its diagonal? $18^2 + 18^2 + 9^2 = 729$, and $\sqrt{729} = 27$, which is the answer. It is also interesting to know that the length of one side added to the height will be the answer in all questions like the last.

The cube root of any perfect cube containing not more than six figures may be ascertained almost instantly. As this may not be generally known, the method will be explained here. Let us cube the nine digits and ten:

$1^3 = 1.$
$2^3 = 8.$
$3^3 = 27.$
$4^3 = 64.$
$5^3 = 125.$
$6^3 = 216.$
$7^3 = 343.$
$8^3 = 512.$
$9^3 = 729.$
$10^3 = 1000.$

It will be noticed that the last figure of each of these cubes is different from that of any of the others. Therefore the cubes of no two numbers from 1 to 10 inclusive can end with the same figure. Let us extract the cube root of 658503. The greatest cube less than 658 is 512, and its cube root is 8; and as the number ends with 3, the last figure of the root must be 7. Therefore the answer is 87.

There is a very easy method of constructing trapezia whose areas shall be integers. To do this it is necessary to construct two right-angled triangles having the same hypotenuse. Let us take two numbers, say 7 and 16, whose squares added together end in 5. Then $16^2 + 7^2 = 305$, and $16^2 - 7^2 = 207$, and $16 \times 7 \times 2 = 224$. Now, as 305 is a multiple of 5, we can use it in forming another triangle, whose sides shall have the ratios of 3, 4, and 5. $305 \div 5 = 61$. Then $61 \times 3 = 183$, and $61 \times 4 = 244$. So we have a trapezium composed of two right-angled triangles having the same hypotenuse, 305. Then our trapezium would be constructed thus:




The area of the first would be $224 \times 207 \div 2 = 23184$, and of the second, $244 \times 183 \div 2 = 22326$; and $23184 + 22326 = 45510$ units, or answer. The area may also be computed by the rule for finding the area of triangles when the sides are given.

## Solutions to Miscellaneous Problems.

*Remark.*—Many of the solutions here given are deduced from Algebraic or Geometrical formulæ, but it is believed to be unnecessary to consider either in the performance of the work.

1. Multiply the selling price by 100. Add 2500 to the product. Extract the square root, and subtract 50 from the result.

2. Multiply the selling price by 100. Subtract the product from 2500. Extract the square root. Add the result to 50 or subtract it from 50.

3. Square the height of the tree. Subtract the square of 36, and divide the remainder by twice the height of the tree.

4. Square the height of the tree. Subtract the square of 48. Divide the remainder by twice the height of the tree, and subtract the result from 120.

5. Subtract 2 from $12\frac{1}{2}$. Divide the remainder by 2. Multiply 8 by the quotient.

6. Add $1\frac{2}{3}$ to $13\frac{1}{3}$. Divide the sum by $1\frac{2}{3}$. Multiply 5 by the quotient.

7. Subtract 1 from 21. Resolve the remainder into two factors, one of which shall exceed the other by 1 (4 and 5). Then 4, 5, and their product (20) will be the dimensions of the parallelopipedon. Whence its surface is easily determined.

8. $\frac{1}{3}$ of the diagonal is the height, and $\frac{2}{3}$ of it is the length.

9. Make 8 the first term, 10 the second, and (100—8)

or 92 the third term of a proportion. The fourth term is the *selling price*, and the *difference* between the fourth term and 100 is the answer.

10. Make $16\frac{2}{3}$ the first term, $18\frac{3}{4}$ the second, and $(100 + 16\frac{2}{3})$ or $116\frac{2}{3}$ the third term of a proportion. The fourth term is the selling price, and the difference between the fourth term and 100 is the answer.

11. Here there is a loss: Make 15 the first term, 12 the second, and $(100 + 15)$ or 115 the third term of a proportion. The fourth term is the selling price, and the difference between the fourth term and 100 is the answer.

12. Make $6\frac{2}{3}$ the first term, $6\frac{1}{4}$ the second, and $(100 - 6\frac{2}{3})$ or $93\frac{1}{3}$ the third term of a proportion. The fourth term will be the selling price, and 100 — the fourth term the answer.

13. Multiply the area of one circle by .3910122.

14. This was explained in a preceding remark.

15. Divide 1 sq. ft. 6 sq. in., or 150 sq. in., by 6. Extract the square root; multiply by $\sqrt[3]{64}$, or 4; square the product, and multiply by 6.

16. As bank discount is merely compound interest paid in advance, find a principal which will produce \$.49 interest in 63 days at 8 % (which is \$35). Then find another principal which will produce \$35 interest in 63 days (which is \$2500). This will be the present worth, which added to \$35 will be the answer.

17. Consider one of the side walls to be laid flat on a level with the floor. Then there will be formed a rectangle whose length is 72 ft. and width 54 ft. Whence the hypotenuse is easily found; that is, $\sqrt{72^2 + 54^2} =$ 90 ft.

18. The square root of half the sum of the squares of the parallel sides will be the length of the fence (13

rds.). Then multiplying the area of the wider half by 2, and dividing by the sum of its parallel sides ($13 + 17$), will give the distance required.

**19.** Multiply \$1 by $\frac{1}{1}\frac{5}{6}$; multiply that product by $\frac{1}{1}\frac{5}{6}$, and so on until $\frac{1}{1}\frac{5}{6}$ has been used as a factor 5 times. (This is the same as finding the present worth of \$1 by compound discount, for 1, 2, 3, 4, and 5 yrs.) Add these products. Then their *sum* : \$5 : : \$5000 : \$6042.95. And \$6042.95 ÷ 5 = the answer.

**20.** 8 men can clear what was on the dock, and what runs on it in an hour, in 1 hr. 12 men can clear what was on the dock, and what runs on it in 24 min., in 24 min. Then 12 men can clear $2\frac{1}{2}$ times what was on the dock, and what runs on it in an hour, in 1 hr. Therefore 12 men — 8 men, or 4 men, can clear $2\frac{1}{2} - 1$, or $1\frac{1}{2}$ times what was on the dock in 1 hr. Then one man's work is $\frac{1}{4}$ of $\frac{3}{2}$, or $\frac{3}{8}$, of what was on the dock, and 8 men's work is 8 times $\frac{3}{8}$, or 3 times that quantity. And the difference between 3 times and 1 time is 2 times what was on the dock, which is what runs on in 1 hr. This is to be kept clear, while the original quantity is being reduced. Now, 6 men can remove $6 \times \frac{3}{8}$, or $2\frac{1}{4}$, what was on the dock in 1 hr. Then in 1 hr. they would gain on the original quantity $2\frac{1}{4} - 2$, or $\frac{1}{4}$ of it, and it would require as many hours as $\frac{1}{4}$ is contained in $1 = 4$ hrs. Also, 7 men could remove $7 \times \frac{3}{8}$, or $2\frac{5}{8}$, of what was on the dock, in 1 hr., and in 1 hr. they would gain $2\frac{5}{8} - 2$, or $\frac{5}{8}$ of the original quantity. Therefore it would require as many hours as $\frac{5}{8}$ are contained in $1 = 1\frac{3}{5}$ hrs., or 1 hr. 36 min. Also, 16 men could remove $16 \times \frac{3}{8}$, or 6 times what was on the dock, in 1 hr. Therefore in 1 hr. they would gain 6 — 2, or 4 times the original quantity, and it would require as many hours as 4 is contained in $1 = \frac{1}{4}$ hr., or 15 min.

**21.** 115 % or $\frac{23}{20}$ of the value of the first house $= \frac{92}{100}$ or $\frac{23}{25}$ of the value of the second. Then $\frac{1}{20}$ of the first $= \frac{1}{25}$ of the second, and $\frac{20}{20}$, or the value of the first, $= \frac{20}{25}$ or $\frac{4}{5}$ of the value of the second, and their combined value is $\frac{9}{5}$ that of the second. The selling price of the first is $\frac{23}{20} \times \frac{4}{5}$ or $\frac{23}{25}$ of the value of the second. The selling price of the second was $\frac{23}{25}$ of its value. The sum is $\frac{46}{25}$ of the value of the second. Then the gain was $\frac{46}{25} - \frac{9}{5}$, or $\frac{1}{25}$ of the value of the second, which $=$ \$110. Then $\frac{25}{25} =$ \$2750, and the first is $\frac{4}{5}$ of \$2750, or \$2200.

**22.** 1 rod of fence would require 4 ($16\frac{1}{2} \div 12$) or $5\frac{1}{2}$ boards, and 1 mile of fence would require $320 \times 5\frac{1}{2}$, or 1760 boards. A square mile (or 640 acres) would require $4 \times 1760 = 7040$ boards. Then 640 acres or boards are to 7040 acres or boards as 7040 acres or boards are to the fourth term. That is, 640 : 7040 :: 7040 : 77440 acres or boards.

**23.** The area of the triangle (by the rule) is 4330.127 sq. ft. Multiply this by 3, and extracting the square root gives the answer.

**24.** Had none leaked, he would have received 130 % of \$2.80, or \$3.64 per gallon, but 9 % having been lost, only 91 % remained. Therefore \$3.64 is 91 % of the intended selling price, which is \$4.

**25.** A's amount for 2 years at 10 % $= \frac{6}{5}$ of his principal; B's amount for 4 years at 10 % $= \frac{7}{5}$ of his principal; C's amount for 6 years at 10 % $= \frac{8}{5}$ of his principal, and D's amount for 8 years at 10 % $= \frac{9}{5}$ of his principal. Let A's principal $= 1$. Then B's $= \frac{6}{5} \div \frac{7}{5}$, or $\frac{6}{7}$ of A's; C's $= \frac{6}{5} \div \frac{8}{5}$, or $\frac{3}{4}$ of A's, and D's $= \frac{6}{5} \div \frac{9}{5}$, or $\frac{2}{3}$ of A's. Then $1 + \frac{6}{7} + \frac{3}{4} + \frac{2}{3}$, or $\frac{84}{84} + \frac{72}{84} + \frac{63}{84} + \frac{56}{84} = \frac{275}{84}$ of A's, which $=$ \$13750. Whence A's $=$ \$4200; B's, \$3600; C's, \$3150; D's, \$2800.

**26.** The first will require 10 hrs. to complete the

circuit; the second, 9 hrs.; the third, 8 hrs.; the fourth, $7\frac{1}{2}$ hrs., and the fifth, 6 hrs. The L. C. M. of these numbers is 360 hrs., which divided by $12 = 30$. Answer, 30 days.

**27.** If the same number remains after each division, the required number must be an exact divisor of the several differences. Then, $1558 - 1166 = 392$; $2244 - 1166 = 1078$; $2244 - 1558 = 686$. Therefore the G. C. D. of 392, 1078, and 686 is the answer, which is 98.

**28.** It was evident that he intended the widow to have $\frac{3}{5}$ as much as the son, and the daughter $\frac{5}{4}$ as much as the widow. Call the son's share 1; then the widow's would be $\frac{3}{5}$, and the daughter's $\frac{5}{4}$ of $\frac{3}{5}$, or $\frac{3}{4}$ of the son's. Then $\frac{20}{20} + \frac{12}{20} + \frac{15}{20} = \frac{47}{20}$ of the son's share $= \$23500$. Whence the son's share is \$10000, the widow's, \$6000, and the daughter's \$7500.

**29.** 4 apples $= 5$ plums; 1 apple $= \frac{5}{4}$ plums. 3 pears $= 7$ apples; 1 pear $= \frac{7}{3}$ apples. 8 apricots $= 15$ pears; 1 apricot $= \frac{15}{8}$ pears. Now, if 5 apples sell for 2 cts., 1 apple will sell for $\frac{2}{5}$ ct.; and 1 plum will sell for $\frac{4}{5}$ of $\frac{2}{5} = \frac{8}{25}$ ct.; and 1 pear will sell for $\frac{7}{3}$ of $\frac{2}{5} = \frac{14}{15}$ ct.; and 1 apricot will sell for $\frac{15}{8}$ of $\frac{14}{15} = \frac{7}{8}$ ct. The L. C. D. of the fractions is 300. Then 300 plums will sell for 96 cts.; 300 apples will sell for 120 cts.; 300 pears will sell for 280 cts.; 300 apricots will sell for 525 cts. The sum is 1021 cts., which is the answer.

**30.** (*a*) $2150.4 \times 476.28 = 1024192.512$ cu. in. Dividing this by $(4 \times 3 \times 2.25)$, or 27, $= 37933.056$ cu. in. Extracting the cube root, $= 33.6$ in. Then $33.6 \times 4 = 134.4$ in., $= 11.2$ ft.; $33.6 \times 3 = 100.8$ in. $= 8.4$ ft., and $33.6 \times 2.25 = 75.6$ in. $= 6.3$ ft., which are the dimensions of the bin.

(*b*) $\sqrt[3]{2150.4 \times 476.28} = 100.8$ inches $= 8.4$ ft., which is the answer.

# Halleck's Psychology and Psychic Culture

By REUBEN POST HALLECK, M.A. (Yale)

Cloth, 12mo, 368 pages. Illustrated . . . . Price $1.25

---

This new text-book in Psychology and Psychic Culture is suitable for use in High School, Academy and College classes, being simple and elementary enough for beginners and at the same time complete and comprehensive enough for advanced classes in the study. It is also well suited for private students and general readers, the subjects being treated in such an attractive manner and relieved by so many apt illustrations and examples as to fix the attention and deeply impress the mind.

The work includes a full statement and clear exposition of the coördinate branches of the study—physiological and introspective psychology. The physical basis of Psychology is fully recognized. Special attention is given to the cultivation of the mental faculties, making the work practically useful for self-improvement. The treatment throughout is singularly clear and plain and in harmony with its aims and purpose.

"Halleck's Psychology pleases me very much. It is short, clear, interesting, and full of common sense and originality of illustration. I can sincerely recommend it."

WILLIAM JAMES,
Professor of Psychology, Harvard University.

---

*Copies of Halleck's Psychology will be sent, prepaid, to any address on receipt of the price by the Publishers:*

American Book Company

New York • Cincinnati • Chicago

# Overton's Applied Physiology

By FRANK OVERTON, A.M., M.D.
Late House Surgeon in the City Hospital, New York City.

OVERTON'S APPLIED PHYSIOLOGY—Primary . . . 30 cents
OVERTON'S APPLIED PHYSIOLOGY—Intermediate . . 50 cents
OVERTON'S APPLIED PHYSIOLOGY—Advanced . . 80 cents

These books form a complete series for the study of physiology in all grades. The Primary Book follows a natural order of treatment and presents the elementary facts and principles of physiology in so simple a way as to bring them within the comprehension of children. The Intermediate Book is designed to be a complete elementary text-book in itself and an introduction to the advanced study of anatomy and physiology. The Advanced Physiology is designed to meet the requirements of teachers and schools for a text-book of Physiology and Hygiene for Higher Grades, which should combine the latest results of study and research in biological, medical, and chemical science and the best pedagogical methods of science teaching. The book represents a new and radical departure from the old-time methods pursued in the teaching of physiology.

The fundamental principle of the series is that the study of anatomy and physiology should be the study of the *cell*, from the most elementary structure in organic life, to its highest and most complex forms in the human body. The effects of alcohol and other stimulants and narcotics are treated very fully in each book of the series.

Illustrations and outline diagrams are inserted wherever needed to explain the text.

*Copies of Overton's Physiologies will be sent, prepaid, to any address on receipt of the price.*

American Book Company

New York • Cincinnati • Chicago

# Popular United States Histories

**BARNES'S ELEMENTARY HISTORY OF THE UNITED STATES**
Told in Biographies by JAMES BALDWIN. Cloth, 12mo, 360 pages. With maps and illustrations . . . . . **$0.60**

**BARNES'S SCHOOL HISTORY OF THE UNITED STATES**
Thoroughly revised and brought down to date. Half leather, 8vo, 432 pages. With maps and illustrations . **1.00**

**ECLECTIC PRIMARY HISTORY OF THE UNITED STATES**
By EDWARD S. ELLIS. A book for younger classes. Cloth, 12mo, 230 pages. Illustrated . . . . . **.50**

**ECLECTIC HISTORY OF THE UNITED STATES**
By M. E. THALHEIMER. Revised. Cloth, 12mo, 441 pages. With maps and illustrations . . . . . **1.00**

**EGGLESTON'S FIRST BOOK IN AMERICAN HISTORY**
By EDWARD EGGLESTON. Boards, 12mo, 203 pages. Beautifully illustrated . . . . . **.60**

**EGGLESTON'S HISTORY OF THE UNITED STATES AND ITS PEOPLE.** By EDWARD EGGLESTON. Cloth, 8vo, 416 pages. Fully illustrated with engravings, maps, and colored plates . . . . . **1.05**

**FIELD'S GRAMMAR SCHOOL HISTORY OF THE UNITED STATES.** By L. A. FIELD. Cloth, 12mo, 454 pages. With maps and illustrations . . . . . **1.00**

**McMASTER'S PRIMARY HISTORY OF THE UNITED STATES**
By JOHN BACH MCMASTER. Cloth, 12mo, 254 pages. With maps and illustrations . . . . . **.60**

**McMASTER'S SCHOOL HISTORY OF THE UNITED STATES**
By JOHN BACH MCMASTER. Half leather, 12mo, 507 pages. With maps and illustrations . . . . . **1.00**

**SCUDDER'S SHORT HISTORY OF THE UNITED STATES**
By HORACE E. SCUDDER. Cloth, 12mo, 296 pages. With maps and illustrations . . . . . **.60**

**SCUDDER'S NEW HISTORY OF THE UNITED STATES**
By HORACE E. SCUDDER. Half leather, 12mo, 546 pages. With maps and illustrations . . . . . **1.00**

*Copies of any of the above books will be sent, prepaid, to any address on receipt of the price by the Publishers:*

## American Book Company

**New York** · **Cincinnati** · **Chicago**

# COMPOSITION AND RHETORIC

**Buehler's Practical Exercises in English** . . . . . **$0.50**
By Huber Gray Buehler, Master in English, Hotchkiss School, Lakeville, Conn. Arranged for use with Hill's Foundations of Rhetoric.

**Butler's School English** . . . . . **$0.75**
A manual for use in connection with the written English work of secondary schools. By George P. Butler, formerly English Master, Lawrenceville (N. J.), School.

**Hill's Beginnings of Rhetoric and Composition** . . . **$1.25**
**Foundations of Rhetoric** . . . . . **1.00**
**Principles of Rhetoric** . . . . . **1.20**
By Adams Sherman Hill, Boylston Professor of Rhetoric and Oratory, Harvard University. New edition, revised and enlarged.

**Hill's Elements of Rhetoric and Composition** . . . . **$1.00**
By David J. Hill, LL.D., U. S. Minister to Switzerland, formerly President of the University of Rochester.

**Maxwell and Johnston's School Composition** . . . . **$0.50**
By Wm. H. Maxwell, M.A., Ph.D., LL.D., City Superintendent of Schools, New York City, and Emma L. Johnston, A.B., Principal of Public School No. 140, Brooklyn.

**Maxwell and Smith's Writing in English** . . . . . **$0.75**
A modern school composition. By William H. Maxwell, M.A., Ph.D., LL.D., City Superintendent of Schools, New York City, and George J. Smith, M.A., Ph.D., Member of the Board of Examiners, New York City.

**Quackenbos's Practical Rhetoric** . . . . . **$1.00**
By John Duncan Quackenbos, A.M., M.D., Professor Emeritus of Rhetoric, Columbia College.

**Waddy's Elements of Composition and Rhetoric** . . . **$1.00**
With copious exercises in criticism and construction. By Virginia Waddy, Richmond (Va.) High School.

---

*Complete illustrated descriptive catalogue sent on application.*

---

AMERICAN BOOK COMPANY
NEW YORK CINCINNATI CHICAGO

# Standard Text-Books in Grammar

METCALF'S ELEMENTARY ENGLISH . . . . . 40 cents

METCALF'S ENGLISH GRAMMAR . . . . . 60 cents

Adapted for use in graded or ungraded schools. The lessons in both books are arranged in logical and progressive order, and followed by numerous illustrative models and exercises.

MAXWELL'S FIRST BOOK IN ENGLISH . . . . 40 cents

MAXWELL'S INTRODUCTORY LESSONS IN ENGLISH GRAMMAR . . . . . 40 cents

A complete course for Elementary and Grammar Grades. The First Book provides instruction for three years' study in Language and Composition. The "Introductory Lessons" includes all the grammar necessary before taking up an advanced course in grammar.

LYTE'S ELEMENTARY ENGLISH . . . . . 35 cents

LYTE'S ELEMENTS OF GRAMMAR AND COMPOSITION . 50 cents

A practical course in language for Primary and Grammar Grades and for Common Schools. In these books Grammar and Composition is made one of the most interesting and most stimulating of the studies pursued in the Elementary Schools.

CONKLIN'S PRACTICAL LESSONS IN LANGUAGE . . 35 cents

CONKLIN'S ENGLISH GRAMMAR AND COMPOSITION . 60 cents

A complete and carefully graded course for Primary, Intermediate, and Grammar Grades, and for Common Schools.

HARVEY'S NEW LANGUAGE LESSONS . . . . 35 cents

HARVEY'S NEW ENGLISH GRAMMAR . . . . 60 cents

These revised editions combine all the elements which gave the original works their simplicity and strength, with the best features in the modern methods of teaching English.

SWINTON'S LANGUAGE LESSONS . . . . . 38 cents

SWINTON'S NEW ENGLISH GRAMMAR . . . . 56 cents

These popular text-books embody new and improved methods of teaching English.

*Copies will be sent, prepaid, to any address on receipt of the price.*

American Book Company

New York • Cincinnati • Chicago

# HIGHER MATHEMATICS

**Church's Elements of Descriptive Geometry (2 vols.) . $2.50**
By ALBERT E. CHURCH, LL.D., Professor of Mathematics, United States Military Academy. Two volumes—Text: Cloth, 8vo, 214 pp. Plates: 4to, 28 plates.

**McMahon and Snyder's Differential Calculus . . . $2.00**
By JAMES MCMAHON, A.M., Assistant Professor of Mathematics, Cornell University, and VIRGIL SNYDER, Ph.D., Instructor in Mathematics, Cornell University. Cloth, 8vo, 351 pp.

**Murray's Integral Calculus . . . . . $2.00**
By DANIEL ALEXANDER MURRAY, Ph.D., Instructor in Mathematics, Cornell University; formerly Scholar and Fellow of Johns Hopkins University. Cloth, 8vo, 302 pp.

**Snyder and Hutchinson's Differential and Integral Calculus $2.00**
By VIRGIL SNYDER, Ph.D., and JOHN IRWIN HUTCHINSON, Ph.D., of Cornell University. Cloth, 8vo, 320 pp.

**Tanner and Allen's Analytic Geometry . . . . . $2.00**
By J. H. TANNER, Ph.D., Assistant Professor of Mathematics, Cornell University, and JOSEPH ALLEN, A.M., formerly Instructor in Mathematics, Cornell University; Instructor in the College of the City of New York. Cloth, 8vo, 410 pp.

**Raymond's Plane Surveying . . . . . $3.00**
With tables. By WILLIAM G. RAYMOND, C.E., Professor of Geodesy, Road Engineering and Topographical Drawing, Rensselaer Polytechnic Institute. Cloth, 8vo, 486 pp., with plates.

**Richards's Elementary Navigation and Nautical Astronomy . . . . . $0.75**
By EUGENE L. RICHARDS, M.A., Professor of Mathematics, Yale University. Cloth, 12mo, 173 pp., with illustrations and diagrams.

**Smith's Elementary Calculus . . . . . $1.25**
By PERCEY F. SMITH, Ph.D., Professor of Mathematics, Sheffield Scientific School of Yale University. Cloth, 12mo, 89 pp.

---

*For complete illustrated descriptive catalogue of Mathematical Publications, write to the publishers*

AMERICAN BOOK COMPANY

NEW YORK CINCINNATI CHICAGO
BOSTON ATLANTA DALLAS SAN FRANCISCO

# Historical Readings

## FOR ELEMENTARY GRADES

| | |
|---|---|
| Arnold's Stories of Ancient Peoples | $0.50 |
| Baldwin's Discovery of the Old Northwest | .60 |
| Conquest of the Old Northwest | .60 |
| Abraham Lincoln | .60 |
| Four Great Americans | .50 |
| Beebe's Four American Naval Heroes | .50 |
| Burton's Four American Patriots | .50 |
| Story of Lafayette | .35 |
| Clarke's Story of Caesar | .45 |
| Cody's Four American Poets | .50 |
| Four American Writers | .50 |
| Eggleston's Stories of Great Americans for Little Americans | .40 |
| Stories of American Life and Adventure | .50 |
| Guerber's Story of the Thirteen Colonies | .65 |
| Story of the Great Republic | .65 |
| Story of the English | .65 |
| Story of the Greeks | .60 |
| Story of the Romans | .60 |
| Story of the Chosen People | .60 |
| Kingsley's Four American Explorers | .50 |
| Story of Lewis and Clark | .25 |
| Perry's Four American Inventors | .50 |
| Perry and Beebe's Four American Pioneers | .50 |
| Persons's Our Country in Poem and Prose | .50 |
| Pitman's Stories of Old France | .60 |
| Shaw's Discoverers and Explorers | .35 |
| Van Bergen's Story of China | .60 |
| Story of Japan | .65 |
| Wallach's Historical and Biographical Narratives | .35 |
| Winship's Great American Educators | .50 |
| Winterburn's The Spanish in the Southwest | .55 |

AMERICAN BOOK COMPANY

NEW YORK CINCINNATI CHICAGO

# Carpenter's Geographical Readers

By Frank G. Carpenter

| | |
|---|---|
| North America | 60 cents |
| South America | 60 cents |
| Asia | 60 cents |
| Europe | 70 cents |
| Australia, Our Colonies, and Other Islands of the Sea | 60 cents |
| Africa. | |

These new Geographical Readers are by far the most attractive and instructive books of their kind ever published. They are not mere compilations of other books or stories of imaginary travels, but they are the results of the author's actual journeys through the different countries, with personal observations of their native peoples, just as they are found to-day in their homes and at their work. These journeys and visits are described in such simple and engaging manner as to make the books as entertaining as stories, while conveying in this attractive way, useful knowledge and information. While they are written in easy familiar style, and in language not above the comprehension of children, they are strictly accurate in every detail and statement.

The books are well supplied with colored maps and illustrations, the latter mostly reproductions from original photographs taken by the author on the ground. They combine studies in geography with stories of travel and observation in a manner at once attractive and instructive. Their use in connection with the regular text-books on geography and history will impart a fresh and living interest to their lessons.

---

American Book Company

New York • Cincinnati • Chicago

C0-DZG-409